YOUR COMPUTER

INCORPORATING ST UPDATE

FEBRUARY 1988

ST Update

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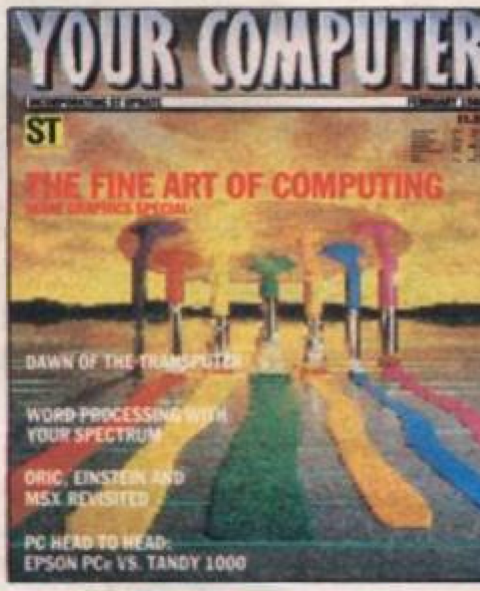
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PC HEAD TO HEAD: EPSON PCe VS. TANDY 1000



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FEBRUARY 1988



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ST UPDATE 47

REGULARS

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FEATURES



NEXT MONTH

A special issue on the Commodore Amiga includes an interview with Tom Hart of Commodore and a survey of the latest available software. We also review an integrated package for the the Amstrad PCW and look at the CIX on-line database. On sale February 11th.



COMMENT

This month, *Your Computer* brings you a comprehensive look at the ever-expanding world of computer graphics. We cover everything from the recent Computer Graphics Exhibition (which is fast becoming a showcase for computer graphics worldwide) to the new generation of software for 16- and 32-bit machines.

As machines such as the Amiga, ST and Archimedes become accepted more and more by programming houses, the software produced for them becomes much more powerful, allowing home users to release at last their full creative talent.

No longer are users reaching the limits of their micros; now they are expanding to fill the almost limitless potential that programs such as Deluxe Paint II and Degas Elite provide. Read on and discover what packages such as these can do. Rest assured that *Your Computer* will continue to cover this exciting aspect of computing.

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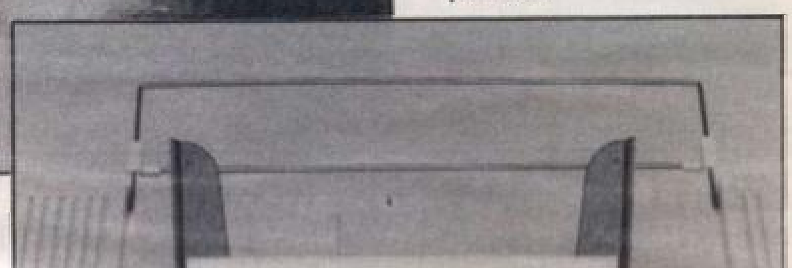
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Amstrad attack



- **Left: The Amstrad PPC now has a BABT-approved modem.**



- **Below: Amstrad can keep the LQ designation on its new range of printers.**

The sound of gunfire you hear is from Brentwood. Amstrad, never slow off the mark when demanding apologies, is mixing it with Toshiba and Epson.

The Toshiba problem stems from the launch of the Amstrad PPC portable. Toshiba likes to think of itself as the company producing top-value, portable PC-compatible machines, so when Amstrad produced a £399 ex. VAT one the Japanese company – cheapest product around £1,000 – made a quick comparative study of the Amstrad and Toshiba ranges and sent it to all its dealers.

Amstrad responded with a point-by-point rebuttal and a strongly-worded request that Toshiba send another letter to its dealers pointing-out that the first letter was not strictly true. Toshiba claimed Amstrad did not have BABT approval for its modem – it did not at the time but Amstrad says it should have it by now – that Toshiba portables are lighter – byte for byte they are – and that the Amstrads will cost an extra £920 a year in batteries.

Toshiba decided that the average user would use an Amstrad portable for 16 hours a week on battery and, by dint of multiplying factors too tedious to explain, reached the £820 annual bill. That does not apply to Toshibas, as they use rechargeable batteries while Amstrad uses ordinary ones.

Conveniently, the additional £920 makes the Amstrad more expensive than Toshiba machines but the Amstrad riposte was, oddly enough, not that it is ludicrous to say the average user of a portable PC gets through 16 hours of batteries a week – he does not. Amstrad replied instead that "in the vast majority of cases users of the Amstrad will be running the computers off the mains".

It is apparent from the foregoing that neither Toshiba – reported now to be worried by the prospect of having to grovel – nor Amstrad can really advise you which portable to buy, should you feel you need one, so here are a few pointers.

First, Toshiba machines may be better than those of Amstrad but at £1,000 – £2,000 for a reasonable specification machine – they are expensive. Buy one if you are to use a portable PC a great deal and high usage justifies the extra cost. Amstrad portables are better value than those of Toshiba. Buy one if you want a halfway house between a desk-top machine and a portable.

The PPC is almost as good as a PC1512/1640. The screen is obviously not so good but this might be an acceptable compromise. Last, do not buy either if you want a real portable – they are too big and heavy. Forget PC compatibility in this case and buy the Z-88 or a Tandy 102.

Epson has decided not to sue Amstrad for using the designation LQ on its printers. The companies have reached an understanding. Both will continue to use the designation and, just to clarify matters "Amstrad plans to introduce the wide carriage LQ5000 in January, 1988." "Epson plans to introduce the LQ500 in January 1988." We do not understand it, either.

Tandy launches 286 machine

Tandy, the American giant, has launched its £2,000 386 machine, first seen at the company's birthday party in the U.S. in August, along with an £1,800 laser printer and a PC-compatible portable for around £1,000.

The machines are an indication of the way prices are going in their respective categories, with £2,000 being the price point now for a budget 386, and budget laser producers vying with one another to get below the £2,000 mark. There will be considerable movement in both categories in the next year, with lasers in particular being likely to break £1,000 by the summer.

When it happens this will get you a fairly cut-down machine, roughly comparable to a first-class dot matrix printer, and the manufacturers will strive to create a separate price point around £2,000 – £3,000 for full-function machines capable of doing advanced desk-top publishing work.

Portables should also reduce in price, although this will depend ón Amstrad ability to head off doubters like Toshiba successfully.

Screen star fades

NEC guarantees its back-lit screen for its new portable for three years and keeps saying so in case you do not have the message. Nobody else does this, for a very good reason. Backlit LCDs do not have a very long shelf life and can start to flake out in 18 months to two years. Naturally NEC is proud of improving this a little but do you still want to buy an expensive portable?



● **Commodore denies that it will cut the price of the Amiga 500.**

Price-cuts for Commodore 64 and Amiga?

The Commodore 64 could be being discounted below £100, with the strong possibility of the Amiga 500 being reduced substantially, too, in the next few months.

A price reduction on the 64 is being talked about because Boots decided at the last minute not to stock the machine at Christmas and the story goes – Commodore denies it vigourously – that it left 12,000 machines without a good home.

Commodore futher denies that it is considering an offer of £45 a machine from a distributor and says it is ludicrous to suggest that there is any surplus of the machines. If it were true? Say you dropped around 10,000 machines on to the market at a trade price of £45, adding a 33 percent margin for the distributor and the dealer would still leave you with a retail price of around £80; and if both parties took a margin of around 20-25 percent we would be talking about a serious pricing bloodbath.

Commodore enemies were meanwhile muttering before Christmas that "bloodbath" was exactly the word Commodore U.K. boss Steve Franklin was using to describe what would happen after he reduced Amiga 500 prices in the spring. Commodore keeps insisting that the recent cuts on the 500 are "the last of its territorial demands" but few people in the trade think so.

At the time they discontinued the 64, Boots also pulled the plugs on the Spectrum Plus 2. That machine is still over-priced and under-powered.

Mega ST gets typesetter

Ace Microsystems has released a Unix-based word processor and typesetting package for Atari Mega STs. The typesetting package, *Lexet*, is no impulse buy at £650 but the word processor, *Lex*, compares favourably some PC packages at £220.

GEM soon for OS/2

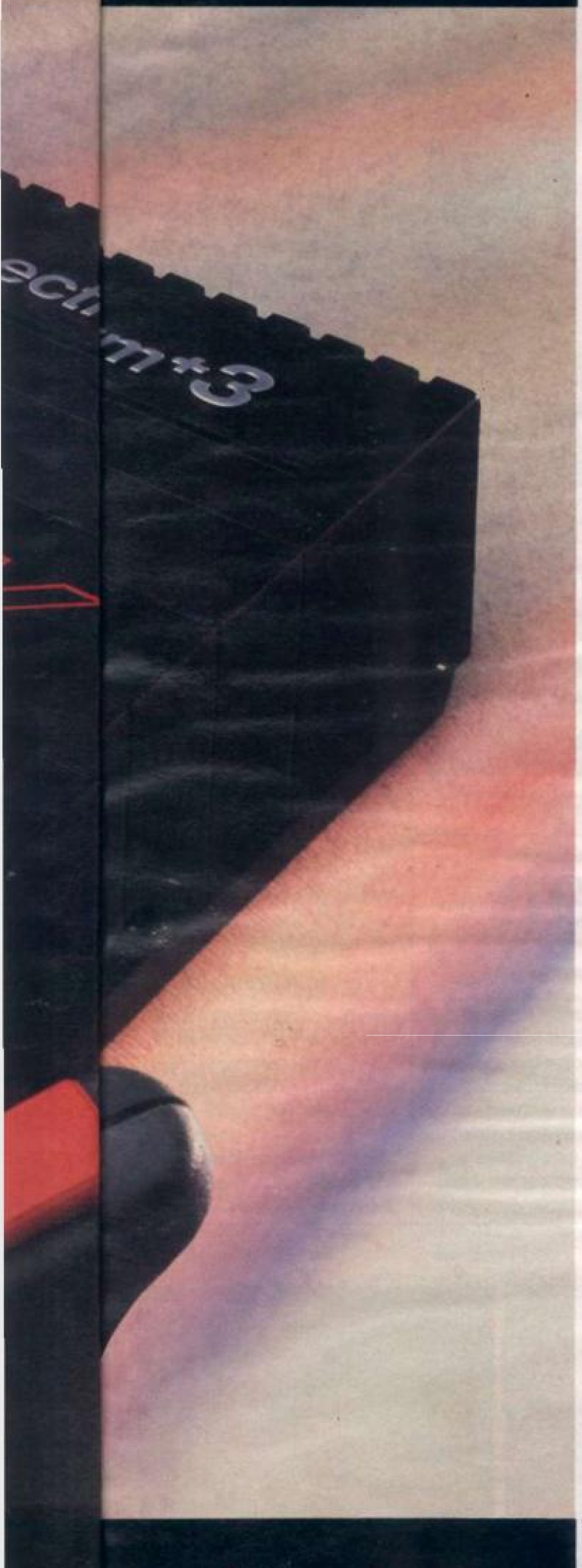
Paul Bailey of GEM-producer Digital Research always gives the impression of having an amazingly logical and plausible plan for the future but this time it makes even more sense than usual.

Some years ago DR, which wrote CP/M, suffered because a small company, Microsoft, produced the operating system for the IBM PC. Microsoft MS-DOS went on to make company boss Bill Gates megabucks, while DR spent some years trying to work out what to do with itself. The answer appears to have been to get into applications and the GEM system is a mechanism for this, a user interface residing between the operating system and the application.

DR therefore had to do something about the new IBM operating system, OS/2, and that is what it has now decided. The new version of GEM, GEM/3, runs faster, is compatible with *Ventura Publisher* and, most important, behaves like OS/2 Presentation Manager.

Presentation Manager is a development of Microsoft *Windows*, which is the Microsoft graphic user interface, and the smart money has been on OS/2 1.1, which incorporates Presentation Manager as being the version of the operating system which will really take off. So by moving to a PM look and feel, DR should be geared to ship applications for the system as soon as IBM ships.

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NEWS

Codemasters asks the Expert

A word about Value Added. It is a term used by the computer trade to describe the process of selling you something you did not know you wanted, so if a dealer can add cables, software and so on to a machine he can probably get a better price than if he just sold you the box.

Computer market veteran Bruce Everiss, now working for budget software company Codemasters, thinks he has worked out how to transfer this pitch to £4.99 games software. Top-selling games like *BMX Simulator* are played to death by games nuts who have paid £1.99 for them. Once they are good at them they will be looking for different pictures, more challenges and the like.

So Codemasters is trying expert versions of its games, giving you two tapes with the original game, expert version and extra scenarios all for £4.99.



● The Darling brother of Codemasters weigh up the pros and cons of their latest products.

Atari denies creating shortage

What was all that about ST shortages and £499 1040STs over Christmas? Atari readiness to put out a powerful machine for less than £500 probably explains Commodore reluctance to scream banzai and reduce the Amiga 500 to £250 but at the time of its own price reduction Atari claimed the deal was costing it money.

The ostensible reason for the reduction was that in the run-up to Christmas Atari U.K. could not lay its hands on any STs and, rather than letting people walk out of a shop with a shudder. Atari boss Bob Gleadow made sure there was an Atari machine with twice the RAM of the Commodore available for the same price.

At the same time Atari continued running its advertising campaign and watched all the free publicity about panic buying of STs roll through the consumer press. The finite nature of the £100 off the 1040 offer stoked the flames.

Atari, naturally, if somewhat smugly, denies it has been doing a very effective job of generating a shortage deliberately, but some of us remember 1983, when "shortages" and "price slashes" were all part of the marketing scheme of Commodore U.K.

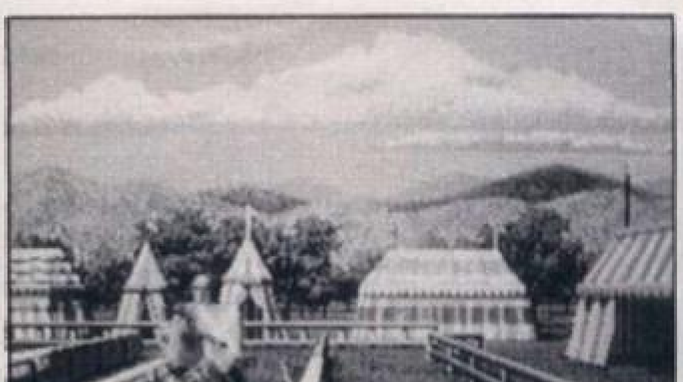
Ex-Apple chairman takes next step

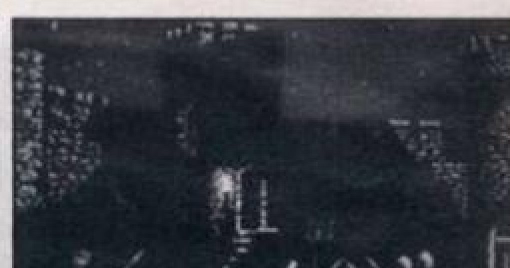
The next wave, courtesy of former Apple chairman Steve Jobs, will hit town in the next few months. His company, Next, has been working on a Macintosh-like machine for some time and intends to start shipping in the summer.

It will have a 68030 processor – two steps up from the 68000 in the Mac – 4MB of RAM and 1,280x960 mono monitor. For $9,000 you will get a colour monitor and 200 MB of disc storage. Standard disc drives for the new machine will be 1.44 MB 3½in. floppies and both of the models will incorporate PostScript-compatible video displays.

Defender on C64

Mirrorsoft has managed to cram *Defender of the Crown* on to a 64 tape version. Defender is one of the classier games of 1987, with graphics which really show what 16-bit computing is about, and Mirrorsoft had been under the impression that it could work for the 64 in disc version.





● Screen shots of combat and jousting scenes from *Defender of the Crown*.



● **Brother has started a European production line for its printers.**

Foreign printers to cost more?

Watch for printer prices doing strange things any time now. The EEC is thought to be poised to put tariffs on Japanese printer imports, hence the feverish efforts by the Japanese – Star and Brother being the most recent to get production facilities in Europe up and running.

There will be no tariffs on printers built here and as most of the big companies can now build here, why should that increase price? None of the manufacturers build all their ranges in Europe and it will be a few more years before they are in a position to do so. Prices will therefore rise on models which are imported, or possibly go down if a manufacturer decides it is uneconomic to import and therefore to clear stocks. If it happens it will all be very odd.

Datacard 4000 clamour from *YC* readers

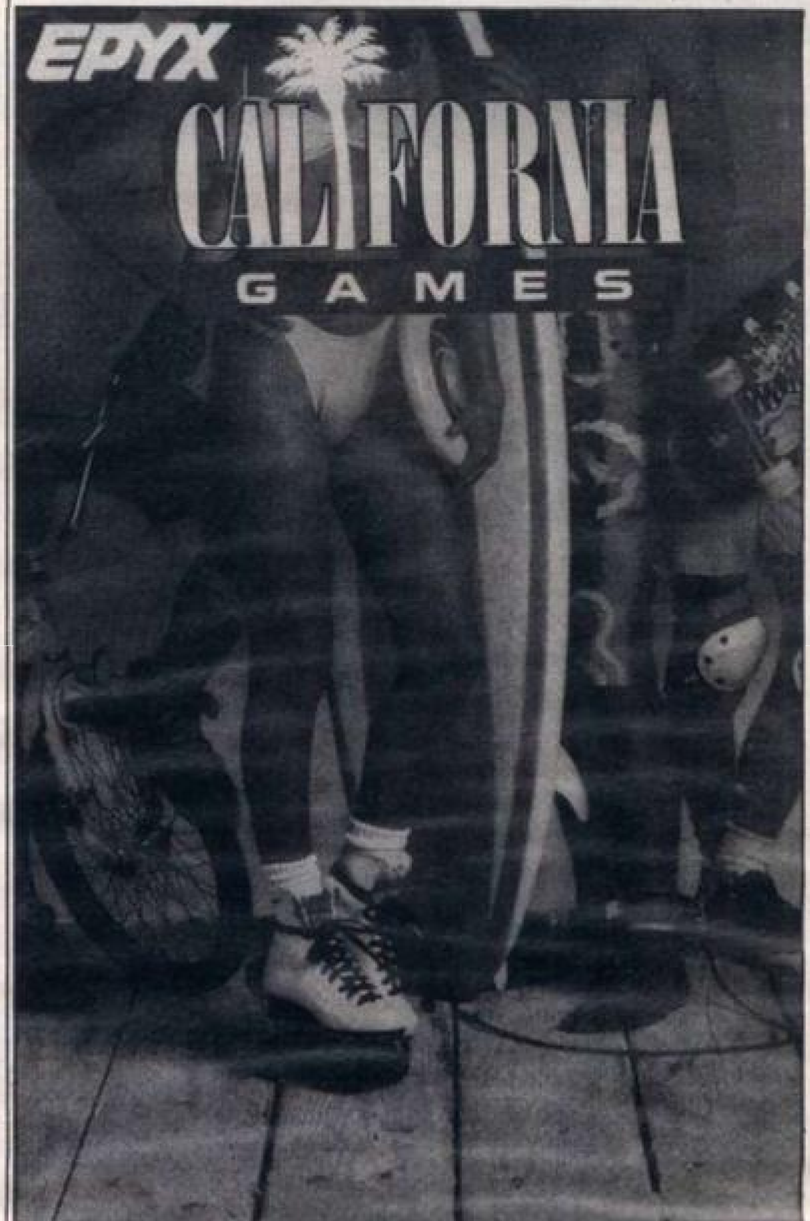
The *Your Computer* office telephone has not stopped ringing since the December issue was published. The subject of all this attention is the article Strictly Personal Computing by Elvin Ibbotston, in which mention is made of the Datacard 4000, a pocket calculator with 4K of memory. It can set alarm calls and list data alphabetically.

For those who wish to know how to obtain it, the Datacard 4000 is available from a mail order company, Quorum. The address is McIntyre House, Canning Place, Liverpool 1. It costs £19.95 plus £2.95 postage and packing.

Indestructible

Mad techies should start saving now for the Mirrorsoft *File Rescue Plus*, launched at the end of January at £24.95. If it is as good as its party piece of being able to retrieve data from a disc on which you have trodden, ground into an ashtray, sawn in half, it should sell in quantity but be warned. If you must pretend to be Paul Daniels with your discs, make sure you use somebody els's machine to haul the data from what is left; even if you get back the information you will make a very nasty mess of your disc drive heads.

The road to California



● **If you're going to California, be sure to wear a skimpy bikini . . .**

The first prize in the *California Games* competition was won by A Crane of Aughton, Lancashire. He receives our congratulations along with a skateboard, an Ocean Pacific T-shirt and California Games.

The following receive an Ocean Pacific T-shirt and a copy of California Games – Keith Young, Weybridge, Surrey; Ben Hunt, Exeter, Devon; Robin Fowler, Camborne, Cornwall; Tim Fawcett, Ulleshelf, N. Yorks; Kevin Pratt, York; Carl Mullin, Withington, Manchester; Elliott Fisher, New Milton, Hampshire; Peter Hansell, Bolton, Lancs; Simon Garrett, Hong Kong.

A Bluebird Aerobie and a copy of California Games are winging their way to Glen Robinson, Callington, Cornwall; Simon Cartwright, Faringdon, Oxon; Dwayne O'Barker, Ashton-under-Lyne, Lancs; Steven Penfold, Pinner, Middlesex; Stella Fisher, New Milton, Hampshire; A Sowerby, Castletown, Isle of Man; A Parker, Hemel Hempstead, Herts; James Bissenden, Aberdeen; V. Cook, Kingswinford, West Midlands.

The last 10 winners each receive a copy of California Games – Stuart Conway, Sittingbourne, Kent; Lee Cole, Hongkong; Paul Timperley, Brockenhurst, Hampshire; Michael Steele, Portsmouth, Hampshire; Andrew Stark, Holbrook, Ipswich; S Birnie, Creswell, Nr Worksop; John Tyrell, Liverpool; Malcolm Simms, Canterbury, Kent; Andrew Harwood, Clifton Farm Estate, Lancs; George Paterson, Moray, Scotland.

letters

Something to say about personal computing? Why not share it with other readers? Write to Readers' Letters, Your Computer, Greencoat House, Francis Street, London SW1P 1DG. Letters may be edited for length. Don't forget to include your name and full address.

Eureka Archimedes!



I am favourably impressed with the December, 1987 edition, particularly for its coverage of the Archimedes. Although I appear to be committed to the Atari ST, I am not disinterested in the Acorn RISC machine, so please keep up the good work and tell us of new software for the Archimedes as and when it becomes available. The proposed word processor from Computer Concepts could be a real show-stopper.

P. Michael Kingston, Yate, Nr. Bristol.

Tell me why

I have a 520 STFM, a 314 1MB drive and a Philips 8833 monitor. Unfortunately I am experiencing minor problems concerning all three. The 1MB drive has to be connected and switched on before a cold start to be recognised by the STFM. If it is switched on afterwards an alert box appears saying that the drive must be connected properly. Why?

Some games software on the ST drive crashes if the 314 is connected. The games start to load but then the desk-top appears and the drive stops. The problem clears if the 314 is disconnected or switched off. Why?

Is it possible to connect the 8833, a VCR, and STFM to load a picture from a video tape into the ST memory? If so, how are the connections made? The 8833 has a VCR connector.

M Blackery, Basildon, Essex.

The disc drive must be connected and switched on before a cold start, because the ST boot routine checks all the drives connected to see if they are active. If they are, it assigns a desk-top icon and enables it for use. If the drive is not switched on, when the software tests for an active drive it does not appear and so is ignored.

The most likely answer to your second question is that the software protection on the game prohibits the use of other active drives. This is difficult to appreciate but some of the protection schemes can be a little odd, to say the least.

To get pictures from the VCR into the ST memory requires a frame grabber/ digitiser, a device which takes the video signal and converts it into bits in the correct format for storage in memory. The October issue of ST Update *contained a review of a digitiser from Silicon Solutions – 0920 84353 – called the Silicon Animation Machine which costs £249.95. It is a sophisticated device which allows frames to be recorded*
I have had a Spectrum for a
frames per second – normal video rate – to every 999th frame.

On downloading

I have had a Spectrum for number of years and have just bought a 520 STFM. There seemed to be no point in getting rid of my Spectrum as I was just learning to write machine code programs for it.

I would like to write a Z-80 assembler on the ST and be able to download the resulting code to the Spectrum. What would be the best language to use on the ST and what kind of connection would I need between the two machines?

I have some knowledge of electronics, so all I really want is some advice, i.e., is the best link RS232 or a direct parallel link? Are there any books which would be of help in this project and, if so, where can I obtain them? Could you also recommend books on Z-80 and 68000 machine code.

A Jones, Colwyn Bay, Clwyd, N. Wales.

Depending on your experience, the best language would probably be Basic, either GFA, HiSoft, or fastBasic. If you want to get a little more advanced you might like to try Lattice C. The fastest connection would probably be a direct parallel link from the ST user port – ST Update, *August, 1987 – to a user port on the Spectrum. The disadvantage with this is that you will have to construct some kind of port for the Spectrum – see* Popular Computing Weekly, *45-48. An RS232 might be easier as there are a number available for the Spectrum. This will be, however, much slower.*

Possible books are Anatomy of the Atari ST *from 1st Publishing, 20B Horseshoe Park, Horseshoe Road, Pangbourne, Berkshire.* The Concise Atari ST 68000 Programmer's Reference Guide *from Glentop, Standfast House, Bath Place, High Street, Barnet, Herts.* 68000 Assembly Language Programming *and* Z-80 Machine Code Programming, *both from Osborne/McGraw Hill. Most good computer suppliers stock them.* Popular Computing Weekly *and* ST Update *back issues are obtainable from Focus Magazines, Greencoat House, Francis Street, London SW1P 1DG.*

Trying to see double

I have a Commodore 64 and 1541 disc drive and have heard that it is possible to use both sides of the disc. Since the 1541 is a single-sided drive, how is this possible?

A Fleming, Durham.

Standard 5.25in. discs have one sprite protect notch and one alignment hole. On the 1541, the alignment hole is unused so if another notch is put in the disc directly opposite the existing one, the disc can be turned over and both sides utilised. It is possible to obtain discs with two notches from various sources and some suppliers sell a notch cutter to enable standard discs to be converted. For best results, use double-sided discs so that you lose no information.

Public knowledge

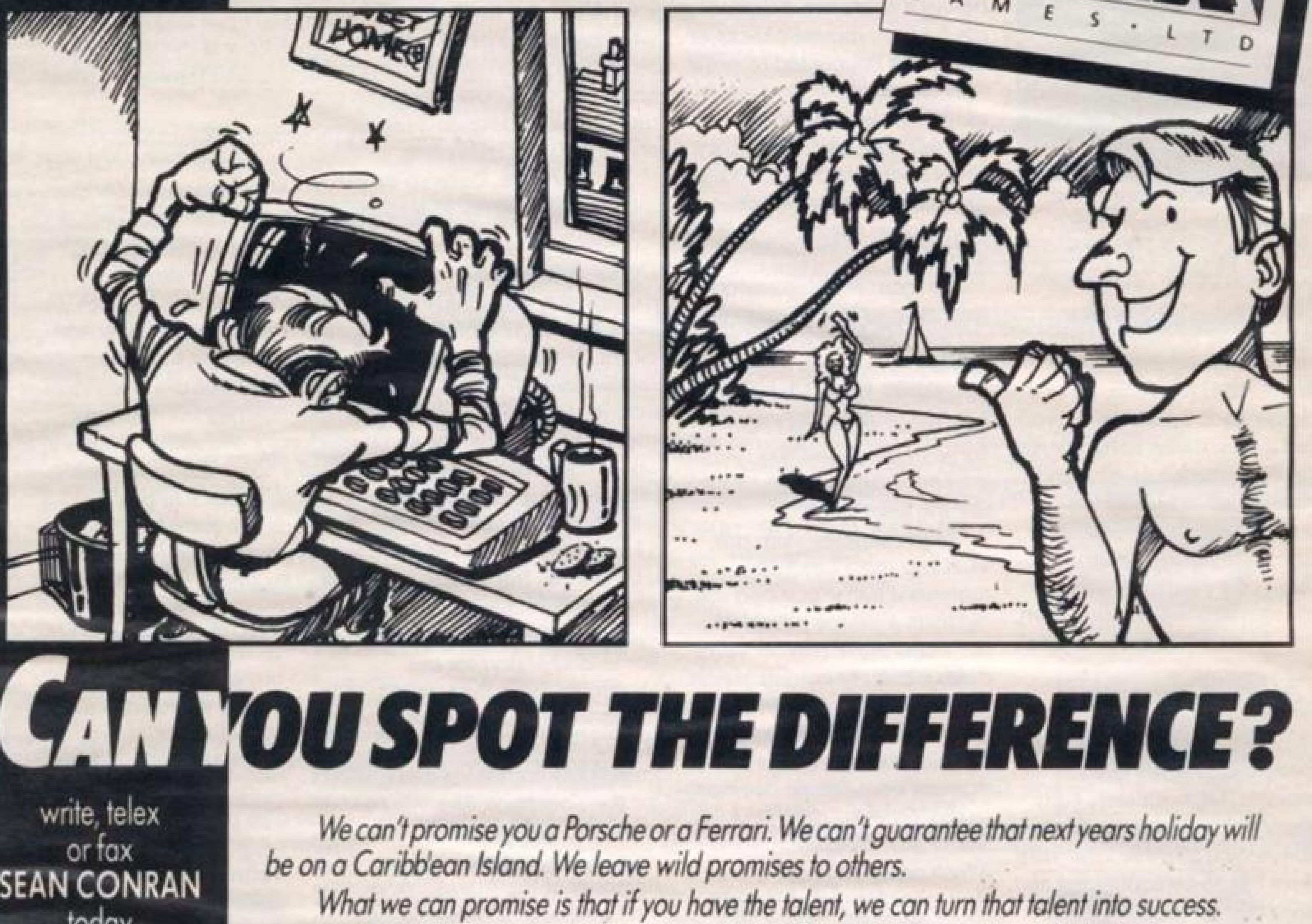
I am buying an Amstrad CPC6128 and would like to know where I can obtain public domain CP/M software in Amstrad format? Could you also give the addresses of some Amstrad user groups?

John Skinner, Norwich.

These addresses may be of use – CP/M user group PIP, 28 Gordon Mansions, Torrington Place, London WC1E 7HF. PD-SIG, Winscombe House, Beacon Road, Crowborough, Sussex. Amstrad Groups Federation, 4 Sutton Road, Gorton, Manchester M18 7PN. Amstrad PD Software, Peter Vass, Computer Services (Scotland) PO Box 244, Glasgow. Amstrad All Machines, J M Green, 33 Malyns Close, Chinnor, Oxon. You might also look through the various advertisements for PD software in the computer press.

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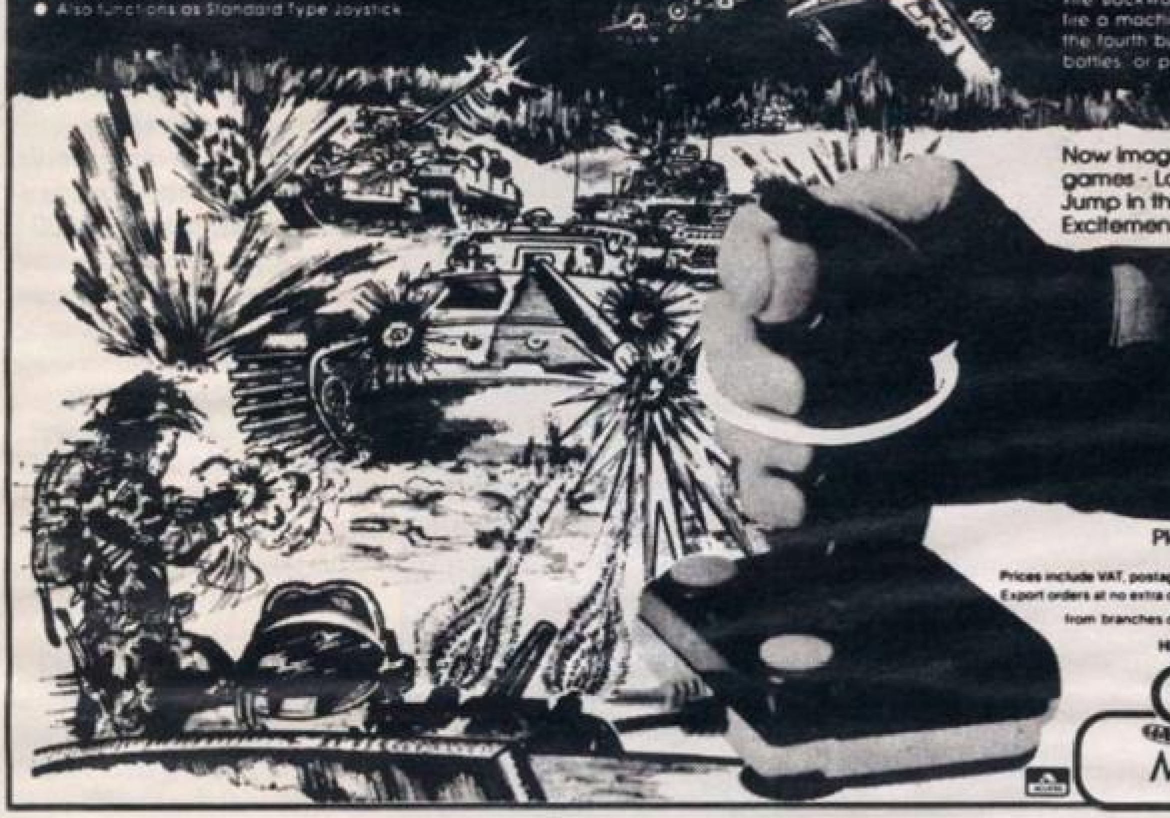
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line noise

Hybrid portable telephone

Portable cellular telephones are all very well if you can justify the heavy costs of the hardware and the call charges but for the time being the closest you will get to portable telephone technology in the home is the humble cordless handset, with its static base unit plugged into the wall.

Now a joint venture company, Libera, set up by Ferranti and Telephone Rentals, has detailed its plans for an ambitious hybrid portable telephone which takes some of the best ingredients of both cellular telephone technology and the economy of cordless telephones to produce a relatively cheap portable telephone, a kind of poor person's cellphone.

The engineers at Libera have taken the cordless telephone principle several stages further by introducing high-quality digital communciations between the handset and the base unit. It improves sound quality and reduces interference distortion suffered by analogue radio receivers in ordinary cordless telephones. In fact, Ferranti claims that the Libera hand-set, or Zone Phone as it is called, uses superior digital encoding techniques compared to current cellular technology.

So you have a high-quality cordless telephone, costing around £230 instead of a minimum of around £700 for a cellphone. Where the Libera system takes off is that it does not restrict you to using your super-digital handset within 100-odd metres of your home-base unit. You will be able to use the hand-set to dial via public communal base stations capable of handling many calls at once. Therefore you carry the hand-set wherever you go.



● **Second generation cordless telephone from Libera.**

It is planned that communal base stations will be situated in petrol stations, airports, railway stations, restaurants, leisure centres, or almost anywhere popularly frequented by people, nation-wide. The base stations will be plugged into the ordinary telephone network and so call charges will be kept to a minimum.

What looks like an immediate snag at first is that you will not be able to receive incoming calls when you are away from your home base station.

Business travellers who need to be contacted frequently will have to stick to cellphones, though a pager could be a workable compromise. Libera is confident that the portable call-out facility is sufficient to make their Zone Phone viable.

Unlike cellular, you will not be able to make calls in remote areas. In other words, you will have to be close to a base station, say within 200 yards. If you decide you need to call someone when you are driving on a motorway you would need to stop at a motorway service area to make your call. Even when there might be a high density of base stations around, each will be independent of the other; there will be no inter-station transparency as in cellular systems.

The technology is proven. It is all technically possible but will it happen? Marketing, the job of persuading users and backers that the ambitious project, scheduled to start service by this time next year, is worth getting involved in will be a tough job. There is no doubt the idea is brilliant and already the French – traditionally eager when it comes to telecoms – have shown considerable interest. The question is will it be brilliant enough to succeed?

Cheap Amstrad smart modem?

Last month we reported on a V22 (1200/1200 baud full duplex) Hayes compatible modem the size of a matchbox, for just £99. Now industry watchers are speculating that Amstrad is on the verge of launching a V22bis (2400 baud) capable Hayes compatible for just £199. That's at least half the cost of its nearest rivals, and just one third of the cost of something like a Pace Series 4 with V22bis capability. Speculation has been strengthened by the revelation that selected versions of Amstrad's new Portable PC (PPC) will have a modem of

such specifications as standard. The difference between a PPC with modem and without is just £150, and Amstrad have confirmed that a V22bis card modem for PCs will be launched soon for around £150. 1987 saw the general availability of high speed intelligent modems come into being, and 1988 looks as though we will witness sharp falls in the cost of all that lovely new technology!

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Midland joins EFTPOS

Midland Bank has announced that it is joining the Electronic Funds Transfer at Point Of Sale revolution following in the steps of other banks, notably Nat-West, earlier last year. The Midland system is called Mid-Night Express, so-called because cheap telephone lines are used during the night to download card transactions from POS terminals all over the country every day.

Participating retailers will run credit cards, or even the new debit cards – like Barclays Connect – through their terminal/cash-register and a transaction coupon receipt will be printed-out ready for the cardholder to sign. You may already have seen them at sites such as petrol stations or some restaurants. EFTPOS terminals are being aimed at retailers who have low average transaction values to deal with, like petrol stations, so there is less need for authorisation codes to be sought. Should a transaction exceed an authorisation threshold limit, the terminal is capable of alerting the retailer, or even requesting authorisation automatically on-line. Invalid cards will also be detectable immediately.



● **Mike Brown, Telemap technical director, becomes vice-chairman of LogOn technology.**

The Italian job

The joint BT/Bell Canada/ EMAP company behind Micronet, Telemap Ltd, has announced new expansion into a foreign market by setting-up a new computer communications venture in Italy. LogOn Technology SRL has been formed by Telemap in partnership with local firms Celint SRL, a comms hardware manufacturer, and Laser Communications SRL. The latter is a major residential electronic publisher and information provider on Italy's equivalent to Prestel, called Videotel, run by the state telecommunications company, SIP.

The new company will operate on-line products and offer an extensive range of videotex support services, ranging from consultancy to the supply of turnkey systems to information providers in Italy.

The first LogOn on-line product is a microcomputing service, Lasernet 800, along the lines of Micronet. Lasernet will have access to a range of Telemap products which have been popular on Micronet, such as chatlines and the *Shades* multi-user game. Telemap technical director, Mike Brown, who becomes vice-chairman of LogOn Technology, commented: "The scene is set in Italy for a dramatic expansion in the use of data communications systems, both in the business and residential sectors." Brown hopes the new company will become the leading service provider to Italian home-computer users.

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Z-88 comms package

Wordmongers received a mention for its Z-88 GTERM scrolling ASCII comms cartridge last month and this time we can reveal that Eidersoft is also working on a comms package for the Z-88. The Eidersoft £99.95 system is based round an inexpensive 1,200/75 baud acoustic coupler, which is not such a bad idea when you remember just how portable a Z-88 is.

The terminal, called ZCom, supports all the usual facilities to be found in a scrolling terminal – XMODEM file transfer – and a Prestel/ viewdata graphics emulation is also promised, though this is proving tricky due to the Z-88 LCD screen limitations.

• • • • • • • •

ST pop-up terminal

Eidersoft has also announced a pop-up comms terminal for the Atari ST, Minicomm. It works as a GEM desk-top accessory and can be called-up from within a separate application. Eidersoft says that because of its inherent GEM compatibility, Minicomm can carry-out impressive tasks such as cutting text from a wordprocessor to be pasted immediately into the Minicomm send buffer. Minicom is expected to sell for around £35.

• • • • • • • •

Alternative viewdata

Epnitex, the 'alternative' viewdata system from Timefame, which suddenly quit Prestel in 1986, has officially gone live. A cursory glance at an Epnitex frame reveals it to be much like any other viewdata screen. Timefame has incorporated some subtle enhancements, including keyword search as standard and extended dynamic – animated – graphics.

Unfortunately Epnitex appears to be tariffed mainly towards business users only, with domestic annual subscriptions costing £125, though this includes some restricted free access time. It will be interesting to see how Epnitex fares in the fast-growing market of private viewdta systems. Epnitex can be contacted on 0526 861136.

line noise



● **Hugo Cornwall, author of Datatheft.**

Hackers' return

Hugo Cornwall, author of the *Hackers' Handbook*, has gone a little up-market with his latest book, *Datatheft*, published by Heinemann for £14.95 in hardback. Cornwall, who in real life is a computer systems consultant, looks at the security problems faced by data processing managers in charge of large computer systems. Hacking, of course, plays an important part in the life of the modern-day data thief. If you lie sleepless at nights wondering who might be tampering with all those gigabytes at work, this impressive volume could be excellent bed-time reading.

● ● ● ● ● ● ●

Data protection register

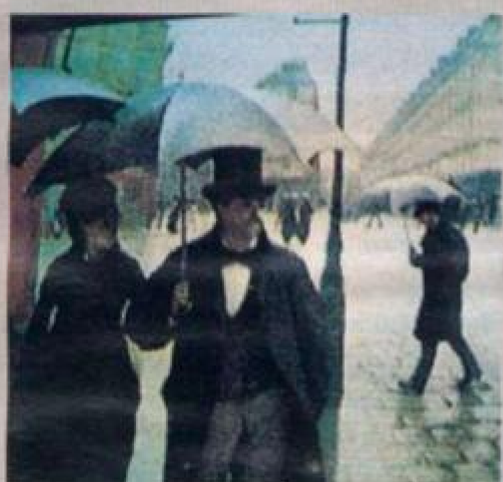
In November the Government data protection legislation came into force. It takes the form of a special register of organisations who store personal details on individuals in computer databases. There are various implications for general computer database operators and several questions hanging over small database operators such as bulletin board sysops.

According to the letter of the law, no-one is exempt from having to register with the Data Protection Register unless – and then you have to wade through paragraph after paragraph of exemption clauses. It would appear that if you have your own private list of people's addresses and telephone numbers you have nothing to worry about. Bulletin boards, on the other hand, are accessible by the general public and, of course, some now charge for the upkeep of their services.

Most BBs operate closed Special Interest Groups or closed user areas and, depending on what was contained in those SIGs, users would inevitably become categorised. Theoretically this would almost certainly mean the sysop would have to register his BB with the DPR. Obviously one might ask who would want to prosecute a little BB for not registering with the DPR? That question may remain un-answered but if you are worried, the Data Protection Register can be contacted on 0625 535 777 or you could have a look at its database on Prestel – see page 500310.

THE *YOUR COMPUTER* GUIDE TO THE NEW ERA IN COMPUTER GRAPHICS.

THE FINE ART OF COMPUTING



● With the aid of a Commodore Amiga, you can create a fine impression of 19th century French art.



● Recent graphics packages for the micro market show up earlier efforts for the dinosaurs they are.

Creating high-quality graphics on 8-bit machines used to be difficult to achieve. Since the arrival of 16-bit machines, such as Atari ST and Amiga computers, the power and flexibility of them has meant that producing stunning graphics are within the grasp of most people with or without experience. The software packages available have been designed with the end-user in mind.

It is not only amateurs who are using these machines to create their minor masterpieces; professionals making a living in art and design have taken full advantage of what is available to them. The Amiga has been responsible for creating the visual graphics on a number of television programs. The effects provided showed that there is no longer a need to spend vast fortunes to make the programs look good. For less than £1,000, the Amiga has shown it can do the job of providing impressive-looking results.

It could be argued that had Leonardo DaVinci owned a computer or at least had access to one, he might have created the Mona Lisa on it and had it printed on a laser printer. Many users and budding DaVincis are doing just that using the computer in an attempt to create a work of art.

Pictures created on-screen can be amended and perfected. For the first time an artist can have total control over his work. If there is a mistake, it can be erased at the touch of a button. There is no need to scrap the drawing and start all over again. The day of the frustrated artist has long gone since the computer revolution.

The Amiga and Atari ST are fantastic machines for the artist to buy but their 16-bit technology looks set to be over-shadowed by the new 32-bit Acorn Archimedes. Already a powerful software package, *Artisan*, has been released and we examine what it can offer.

Moving back to 16-bit machines, Electronic Arts has provided a few packages to help in the creation of art. We look at two of its packages, also at two packages from Mirrorsoft and Aegis.

The future of computer graphics is very promising. You have only to look at the promotion video of any current pop single to see how much computer graphics make and enhance music. It is only the last five years that great inroads have been made, yet the leap has been enormous. *Your Computer* viewed the Computer Graphics '87 exhibition to check what you will be able to achieve in the future.

Computer graphics play an increasingly important role in our lives. The graphics are used not only for artists but also by companies which send mail shots. Mailshots also play an important part in our life – some would argue they are a complete waste of time – so how they look is very important. There are several software packages which, for less than £100, will allow you to create the perfect look and image for yourself.

At the end of the day, it is not only the software which is needed; originality and ability are also required. The machine and the software are only as good as the users. One is not a substitute for the other. With our guide to graphics, we hope to provide some information on what you can do and how to achieve those all-important results, get out your paintbox and start being creative.

ART FOR THE MASSES

AMIGA

The Amiga has three graphics resolutions – low, 320 x 200; med, 640 x 200; high, 640 x 400 – and a palette of 4096 colours.

DPAINT

All recent buyers of the A500 will have received a copy of the Electronic Arts *Deluxe Paint* bundled with the machine and should have spent at least a few hours getting to know it.

It is no exaggeration to claim that DPaint set the standard for graphic art on the Amiga and introduced the EA International File Format to allow transfer of files between programs. The Pal version of *Deluxe Paint II* has just arrived in the U.K. so I will concentrate on the features of this program where they differ from the earlier version.

Both programs are very complex and have a bewildering range of options available to the user, so the well-written, modular manual is a joy to behold and has tutorials for the novice as well as full details of the program and its interaction with the Amiga memory for the use of experts upgrading from DPaint I.

The packages take advantage of the Amiga Intuition system by using both icons and pull-down menus to keep almost the whole range of features at your fingertips. Virtually every conceivable variation of moving and viewing a painting is permitted. ZOOM allows detail to be made precise and BLEND softens sharp edges. The term BRUSH becomes arbitrary, since the user can define almost any shape as a brush and produce dazzling abstract effects at the drop of a hat.

Programmers can use this utility to create backdrops for games as seen in various karate simulations and DPaint II will even allow for scrolling by letting the artist define his canvas size up to 1,008 x 1,024 pixels, although there is a corresponding loss of the number of colours available as resolution increases and memory can still be a major limitation to the hi-res artist.

AEGIS

Like EA, Aegis was a pioneer in the field of Amiga graphics and produces a full range of applications software.

The drawing package, *Images*, is available alone or together with *Aegis Animator*. The difference, apart from price, is that if you choose the animation version you will lose the option of drawing in hi-res, but since most of the classic pictures on the Amiga have been produced in lo-res mode this should not be a problem.

The program works in much the same way as DPaint but has the colour palette shown in a window on the drawing area rather than as icons on one side. All other functions are accessed from pull-down menus.

Once again the manual is detailed, laid out logically and amply covers the various program features which are essentially the same as DPaint II. Both DPaint and Images have discs of "clip-art" available which consist of IFF files of backgrounds and brushes which can be used together to create paintings. Alternatively, items can be used as part of your own original artwork.

1



1 ***Deluxe Paint II*** **from Electronic Arts is a package of commendable versatility.**
Above: It can reproduce familiar images such as the death mask of Tutenkhamen.

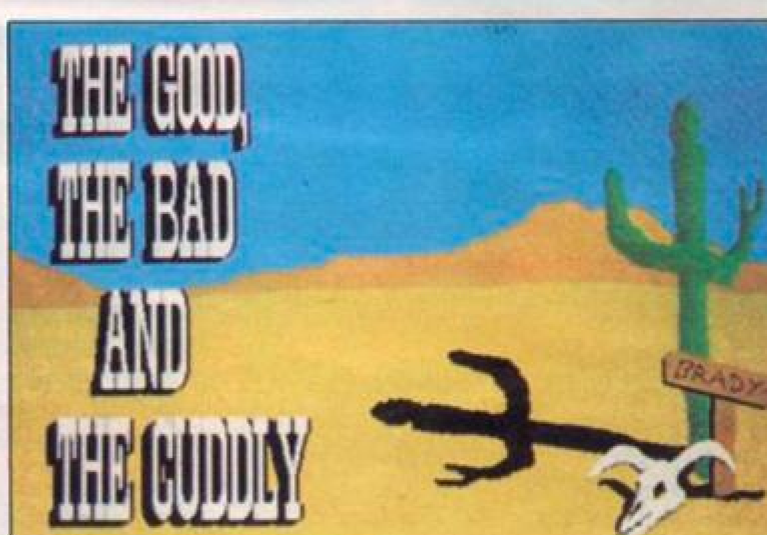
2 **Below: DPaint II comes straight to the point with the pointilist style of Seurat.**

3 **Below: DPaint II can also adapt itself to cartoon-style graphics, as this still from a recent Channel 4 television programme shows.**

2



3



The main problem for the computer artist/designer on the 8-bit micro is the rate at which high-quality graphics consume memory. Although a good microcode programmer can pack plenty of action into a small part of RAM, many recent titles have suffered from the great graphics, no gameplay syndrome.
The new generation 16-bit micros with around 10 times the usable memory of their earlier counterparts lend themselves readily to the production of games with excellent graphics, business displays, CAD and video titling but they will produce art for its own sake, too.

To their credit, software companies on both sides of the Atlantic have been quick to respond to the potential of 16-bit micros in graphics applications and this month we look at a range of packages for the main rivals for the home market, the Commodore Amiga and the Atari ST.

ATARI ST

The Atari ST offers the same graphics resolutions as the Amiga but has a palette of only 512 colours.

DEGAS

Degas Elite is the improved version of Degas and is marketed by EA under the Batteries included label. The name Degas has nothing to do with the French impressionist but is, coincidentally, an acronym for Design and Entertainment Graphic Arts System.

The program will operate in each of the ST graphics modes but the selection must be made before the main program is loaded. The resolution selected will allow for two, four or 16 colours – hi-med-lo. A monochrome monitor is needed for hi-res and the program defines med-res as 320 x 400.

One useful feature is that Degas allows multiple workscreens. Usable memory limits 520 owners to two screens while the 1040 allows eight. Brushes and Blocks are recognised as drawing tools by the package. There are 15 brushes from which to choose but each can be re-defined by the user. Blocks are similar to the cut-and-paste options on other programs and again are user-defined. A showpic utility is included to allow the artist to display his talent. The manual supplied is comprehensive, easy to follow and contains sufficient detail to please everyone.

ART DIRECTOR

The Mirrorsoft *Art Director* is unusual in that it was programmed in Hungary and was brought to the U.K. under licence by Andromeda Software. The program works in lo-res – 320 x 200 – and allows the use of 16 colours from the ST palette of 512.

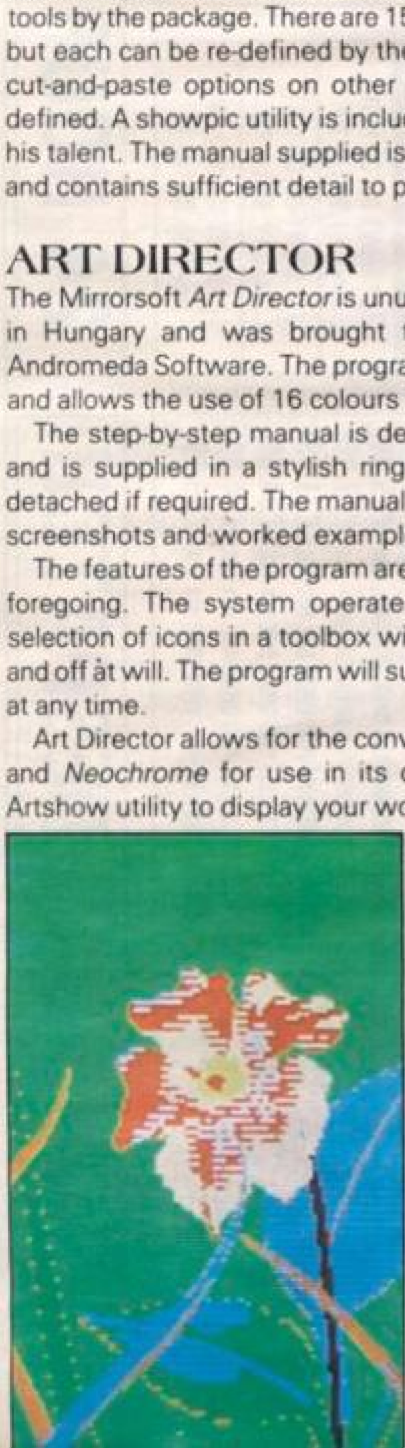
The step-by-step manual is definitely the key to the program and is supplied in a stylish ring binder, so that pages can be detached if required. The manual is finely-detailed and has many screenshots and worked examples to make things clear.

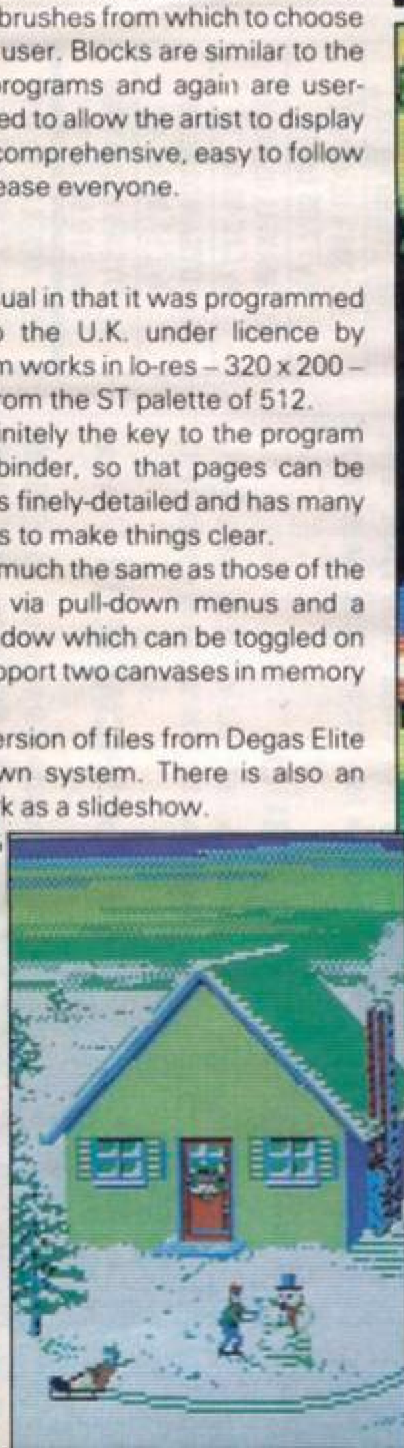
The features of the program are much the same as those of the foregoing. The system operates via pull-down menus and a selection of icons in a toolbox window which can be toggled on and off at will. The program will support two canvases in memory at any time.

Art Director allows for the conversion of files from Degas Elite and *Neochrome* for use in its own system. There is also an Artshow utility to display your work as a slideshow.

7




4


5


4, 5, 6 ***Degas Elite*, also from Electronic Arts, exploits to the full the 512-colour palettes of the Atari St.**

7 ***Art Director* from Mirrosoft is an excellent package made easy to use by a well-written manual.**

ART FOR THE MASSES

SUMMARY



It is impossible to cover in detail the whole range of facilities for each of the foregoing art packages. Therefore in each case I have tried to present the features of each piece of software which set it apart from its rivals.

All of the programmers have tried to produce a system to simulate the range of techniques available to an artist working with brush and palette. Tools such as user definable brushes, airbrushes and fills are common, by one name or another, to all the programs, along with techniques such as shade, smear and smooth.



Where a conventional artist would need to plan perspective views and surreal effects, the computer allows those techniques to be applied almost at will and with very little effort by virtue of commands such as bend, rotate and distort. The computer artist can also save his creations as required and has the option to reverse any changes he feels did not improve the piece.

In the table I have attempted to show the main features of each package and given a personal ranking out of 10 for factors important to the new user.

Since I was asked to compare the artwork I have seen on the two machines, I must say that I much prefer the pictures I have seen on the Amiga. Clearly the Amiga artist has more colours available in any graphics mode and that permits much better shading to give the pictures more warmth and depth. The comments are not intended to re-kindle the flames of the Amiga-ST war, nor do I intend to declare myself a diehard Commodore supporter as I am content to go on record as having always held 8-bit Atari computers to be superior to the C64 in all respects except sound.



I admit that the amount of work an artist puts into his pictures can make a vast difference, in that I have seen excellent pieces on the ST which outshine mediocre offerings on the Amiga. If we compare, for example, the classic *King Tut* picture as rendered on each machine, the Amiga colours are certainly richer and more realistic.

I must now suggest that Eidersoft may have a spanner to throw in the works in the form of *Quantum Paintbox* which apparently will offer no fewer than 412 – i.e., the full ST palette – colours on screen in med-res and an interlace mode which allows 4,096.

Unfortunately, no review copy of the program was available but, with a price of only £19.95, it could take over the ST graphics market.

Of the four packages I have seen and used I prefer DPaint II but at almost four times the price of the Aegis Images, I would not say it is four times as good. For around the price of DPaint II, Aegis will supply Images and a sophisticated animation package to compete with the EA Deluxe Video, the Pal version of which is scheduled for February release.



I found Art Director to be the ST package with which I was most comfortable, probably because the manual is so good and took me into the more attractive and dramatic features of the program very quickly. Once again, though, it is the dearer of the two being compared.

Overall, then if you are considering an art package for its software development potential, I would advise buying the best you can afford. If you are dabbling, or if price is a major consideration, you will not lose too much by taking the cheaper option. ST owners should definitely look at Quantum Paintbox before taking the plunge on another package.

Remember, art is very personal and a picture I find pleasant or interesting may leave you cold, so try any package before you buy it and, if your local shop will not let you play with the goods first, buy it elsewhere.

	Variable modes	User defined brushes	Polygons	Fill	Zoom	Rotate etc	Cut & paste	Fonts	Print-outs	Ease of use	Manual	Price	Comments
DPaint II	●	●	●	●	●	●	●	●	●	9	9	£99.95	2 disc package; 2 art discs available at £9.95 each
Images	○	●	●	●	●	●	●	●	●	7	6	£28.75	Available with Aegis Animator at £103.50 1 art disc available at £23
Degas Elite	○	●	●	●	●	●	●	●	●	6	6	£24.95	1-disc package
Art Director	○	●	●	●	●	●	●	●	●	8	9	£59.95	2-disc package

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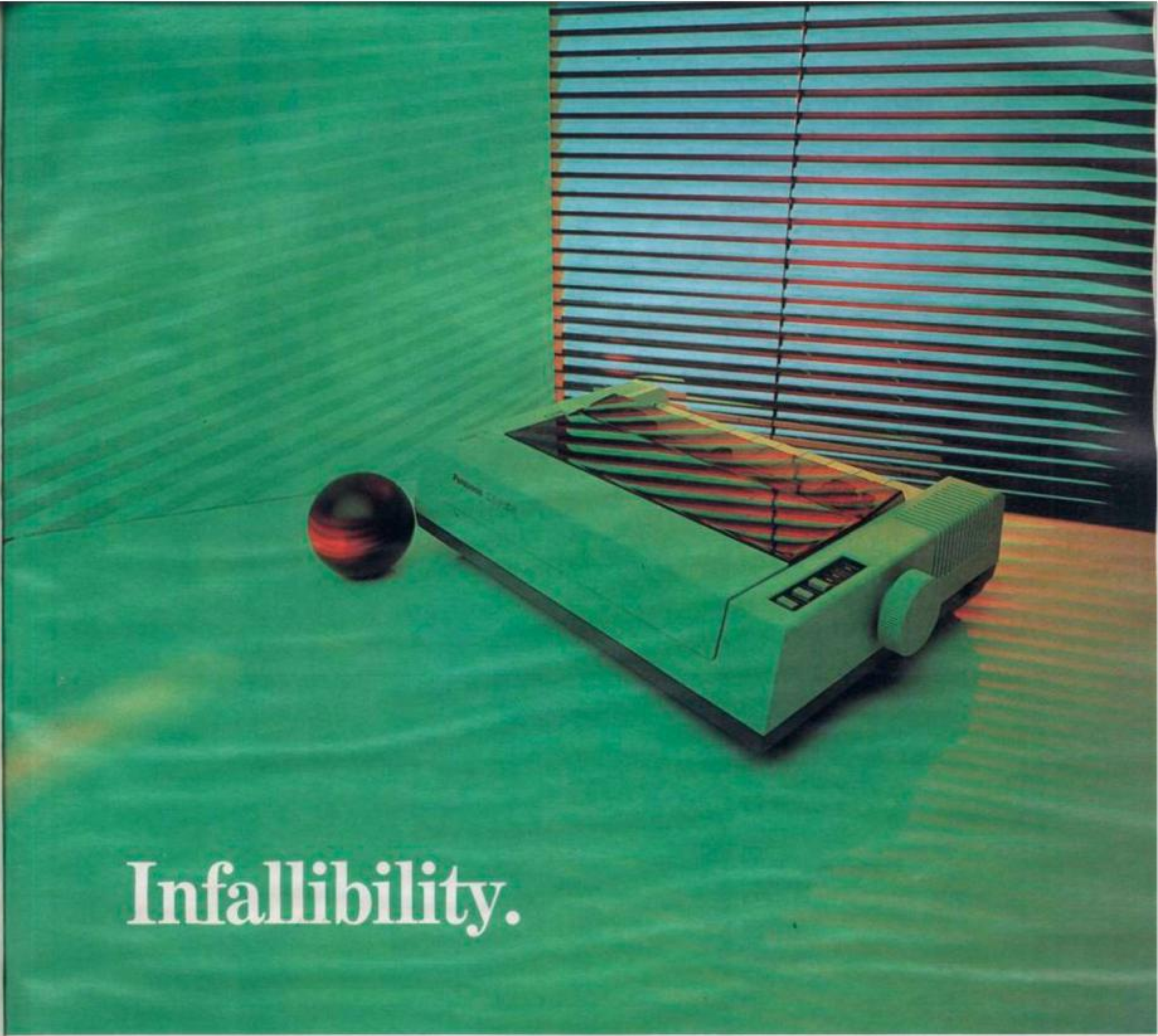
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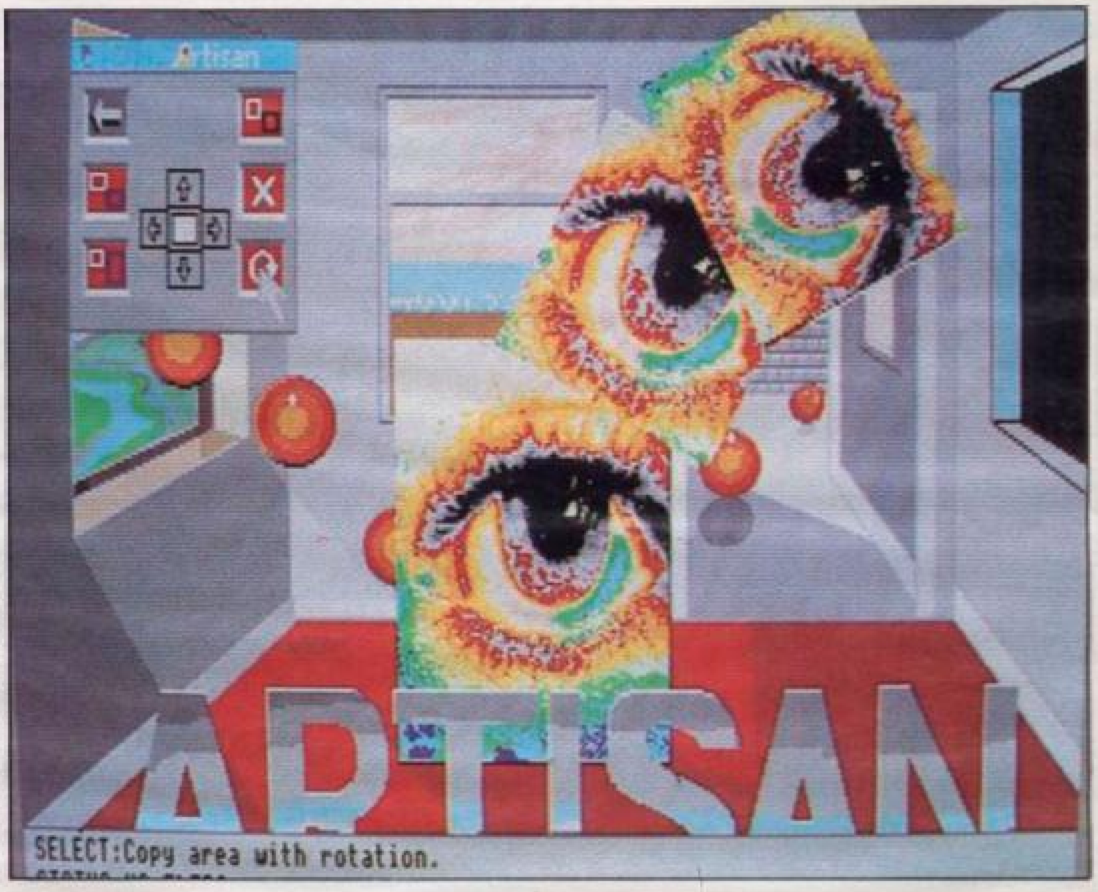
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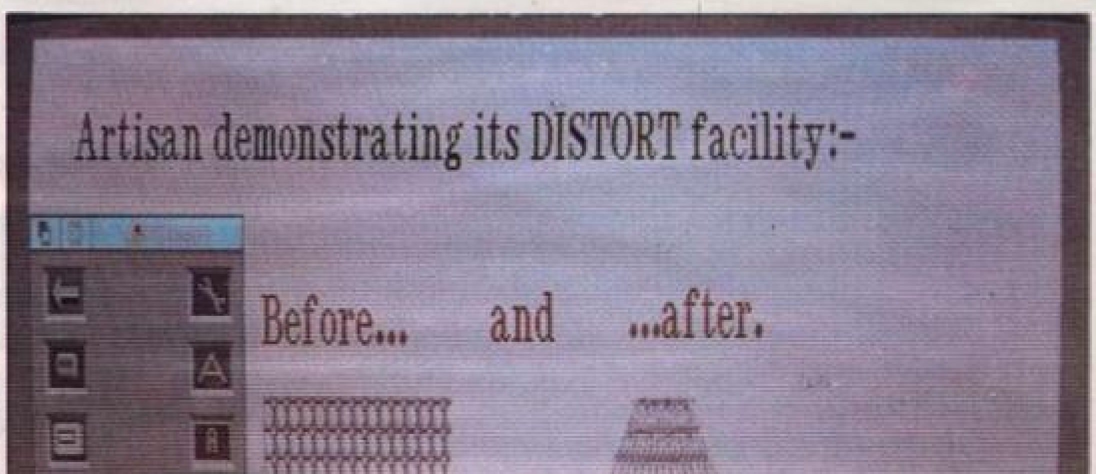
Title: Artisan Price: £49.95 Publisher: Clares Micro Supplies (0606 48511)

THE WORKER'S REVOLUTION

IS THE FIRST ART PACKAGE FOR THE 32-BIT ARCHIMEDES TOO RUSHED? ARTHUR KING INVESTIGATES.



● Artisan will only work in a 16-colour mode, instead of the maximum 256-colour mode of which the Archimedes is capable.



● The DISTORT facility is useful but could be more comprehensive.

Clares is one of the determined band of relatively small software houses from the 8-bit BBC Micro era to take the plunge into the Archimedes 32-bit Reduced Instruction Set Computer renaissance. The company started several years ago selling the odd utility here and there, slowly building a reputation for cheap, no-nonsense, utility packages and ROMs for the BBC B. Then Clares hit the big time, Mirrorsoft hiring it to produce *Fleet Street Editor* for the BBC B.

After that project was completed, the two Clares programmers responsible for Fleet Street, Frank Dart and Jon Warmisham, went to work on the Clares monochrome art system, *Art Room*, to compete with *AMX Art*. As soon as the Archimedes project was confirmed unofficially and Acorn had started to look for software houses to provide initial software support, Clares moved fast. Besides providing several of the Archimedes Welcome Disc programs, it was one of the first companies to start serious Archimedes applications projects.

To date, Clares has produced three Archimedes packages – *Advanced Toolkit Module*, a disc-doctor type set of routines; *Archive*, a Windows Icons Mice and Pointers – operated word processor; and *Artisan*, the sequel to Art Room and the subject of this review.

Like most art packages today, Artisan is completely WIMP-driven and virtually the only time you need to access the keyboard is when naming files or typing text on to a chosen part of your picture. Artisan is easy to use immediately and many of its features and options can be utilised without the need to refer to the user guide. That is just as well, as the supplied instruction book is of only 37 pages and is not illustrated.

MODE 12

An immediate disappointment with Artisan is that it is designed to use screen mode 12 only. That is a 16-colour mode, as opposed to mode 15 which offers a full 256 colours on-screen at one time. Mode 12 is a high-resolution screen, offering 640 x 256 pixels, comfortably higher than any other home computer art package at present, and the user can select from 4,096 palette colours.

Sticking to the 16-colour mode has made the job much simpler for Clares and frees 80K minimum – mode 12 uses 80K of screen memory while mode 15 uses double that – thus ensuring that Artisan can be shoe-horned into the base level 512K Archimedes A305 machine.

Artisan is supplied on a single 3.5in. disc and Clares recommends that the user should take personal back-ups; there is no annoying disc copy-protection system. Boot-up the disc and you will notice several things happening before the top Artisan icon window appears. The boot file appears to juggle memory workspace a little and also set some configuration parameters, which requires a system Break.

According to the manual, the user must initially re-configure up to six parameters before Artisan will run under the Arthur operating system, version 0.20. This review was conducted on a 1MB A310 machine with Arthur 0.20 and I was pleasantly surprised that the disc booted-up with no need for any prior parameter shuffling.

The Archimedes mouse has three buttons and they are used to good effect in Artisan. The left mouse button is termed "Select", which is self-explanatory. The centre button is used for calling-up menus; when in drawing mode the current menu will disappear as soon as the mouse pointer leaves the menu window. That is to ensure the screen is free of obstructions. I found it very tricky to get the hang of keeping the menu window to stay at first but one soon learns to appreciate the feature. To adjust things like circle sizes and rotation angles you will need to press the right-hand button while moving the mouse up or down.

Booting the disc reveals an eight-icon window offering – 1, help; 2, sprite; 3, disc filing; 4, paint; 5, banding; 6, toolkit; 7, cut and paste; 8, exit.

If you cancel that menu you are left with a completely blank white screen except for the familiar blue Archimedes pointer. You can start doodling immediately as the default pen is a small blob and red is the default colour. Press the menu – centre – button to recall the top icon menu. All the main menus leading from the top menu are linked sequentially via forwards/backwards arrow icons in each. At first that might sound cumbersome but as there are only six sub-menus immediately off the main top menu it is simple to exploit.

New users would be well-advised to use the Help option as it provides a status line at the base of the screen explaining what the currently selected icon does and it works on all of the many windows Artisan has to offer. Many of the icons are self-explanatory but equally as many are somewhat cryptic. How about the Sprite icon? It has an image of a little black cat. According to the user guide it was chosen for no better reason than that the wife of one of the programmers is a cat lover.

Some icons do not have a function and the status line pops up with the report "just an artistic embellishment". The help function will be dispensed with by experienced Artisan users but it is invaluable to get you started.

Sprite gets you into the Artisan sprite handler. Sprites are lumps of screen memory, up to the size of a screen which can either be manipulated by the Archimedes Sprite commands for animation or they can be used as extended user-defined graphics for use in Artisan or other programs.

Sprites can be designed using the normal Artisan drawing facilities and then grabbed for use later, either to disc or to be used immediately as a drawing aid. There is also a facility for making selected colours transparent to others.

The disc filing icon looks like a disc. Artisan deals with four types of file – Sprites, extended Colour Fill pattern designs, Palettes and Screens. Files of those types will be listed by category when the disc icon is clicked. Click over the file required and it will be loaded after a confirming prompt has been given. Artisan does not *LOAD screen data into screen memory which would be very fast but against OS user guidelines, so there is a frustrating delay as the screen is filled byte-wise from disc. After all, even mode 12 screens are 80K long.

Paint is the main Artisan function. Clicking the paint option brings up a large icon menu featuring the Artisan battery of painting facilities. We will look at them briefly one by one.

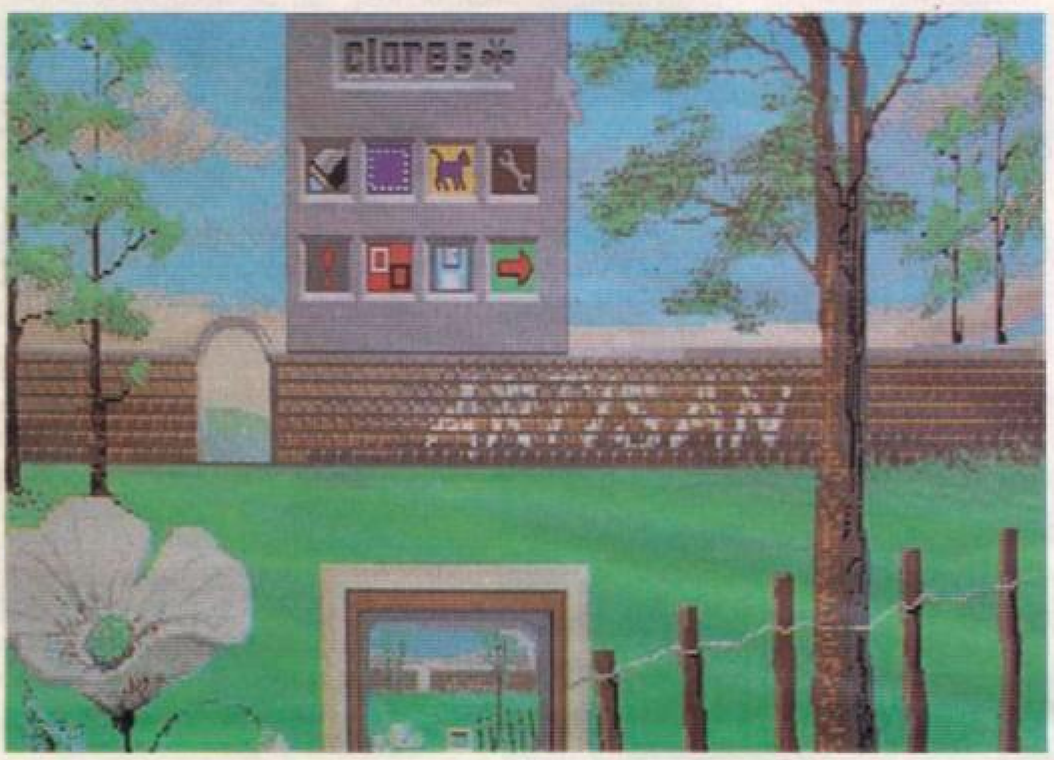
FACILITIES

PEN SHAPES. A variety of pen nibs are offered, the default being a small blob or circle. Triangles or squares can be selected.

ZOOM EDITOR is a three-stage magnifier – two, four or eight times the screen area currently pointed at by your pointer or pen. The zooming factor is adjusted using the right-hand adjust mouse button. The pointer becomes a pixel-level editor in the zoom window, colouring selected pixels according to the currently-selected palette colour. To move round he whole picture while still in zoom mode all you need to do is drag the picture bars on the sides of the window. The zoom window can also be re-sized to reveal more or less of the magnified area.

FILL is represented by the traditional paint-roller icon. Clicking the pointer while fill is active will flood-fill an enclosed area of the screen with the currently-selected colour or ECF pattern. Fills can over-fill earlier fills if required. As with all plotting functions, the last action, including a complex fill, can be erased or undone by pressing the right-hand mouse button. The ECF option can be a little troublesome; trying to fill one pattern over

THE WORKER'S REVOLUTION



● Despite certain drawbacks, Artisan is capable of creating appealing images.

another will fail and hand back control to you. Clares blames this on an OS bug but at least the program does not get stuck in a loop.

USER PEN is the icon used to select any user defined pen nibs if present. If none is used you get a default black rectangle. Another icon, the PEN DESIGNER, is selected to create your own nibs. The full 16 colours can be used to design your pen and transparent colours are also selectable. That permits a pen to be shaped irregularly without leaving a square background shadow behind.

PALETTE lets you select in which colour you want to draw and this is accommpanied by ALTER PALETTE which produces the standard Archimedes palette adjustment window. Red, green and blue sliders allow you to select precisely which of the 4,096 available colours you want to select as one of your 16 usable colours. Palettes can be saved for re-use later.

Next is the ECF DESIGNER, a simple pixel block design facility similar in layout to the pen designer. An 8x8 pixel grid can be designed using any of the 16 colours to form a fundamental building brick of your custom fill design. ECFs can be saved to disc for later use.

Finally there is what Clares calls its MAGIC BRUSH. It is an interesting feature which lets you choose target colours to be transformed to newly-selected ones when the brush area makes contact with the nominated target hues. Imagine you want selected parts of your picture changed from green to red. You select green as your before colour, red as the after, and sweep your brush carefully over the parts of the picture which require the action.

CHANGE

More than one colour can be set to change at a time, too. The effects can be very pleasing, especially when several colours are used. With careful colour selection you could turn parts of your picture into colour negatives.

The Move and Copy menu has some really entertaining features. You can flip selected blocks of the screen either right/left or up/down, a standard block copy is provided, and copies can also be scaled up or down to reduce or magnify portions of the screen permanently. Once again there is an option to EXCLUDE colours or make them transparent so that patterns can be allowed to show through whatever has been clock-copied on top of them.

Best of all is the ROTATE function. It does not simply rotate blocks in 90-degree moves, as is usual on ordinary BBC art packages; rotation can be through any of 360 degrees. Though distortion can result with some angles, the effect can be very vivid. Angle selection is performed by moving the mouse up or down, according to the direction of rotation required, with the adjust button kept pressed.

It goes without saying that Artisan has rubber banding, the ability to move lines and shapes round the screen, often from a fixed point, before "fixing" them. Lines, triangles, parallelograms and rectangles are all catered for. There is also a linked line option, where the end of the last line becomes the beginning of the next. Circles are catered for independently of ellipses and the latter can be rotated through any angle, along with segments and chords.

An unusual feature is the rubber pen. It lets you create a closed shape with up to 64 corners which can then be reduced or enlarged to suit. All closed shapes can be plotted as outlines or solids. Unfortunately there is no facility for line thicknesses to be altered. The palette, including ECF patterns, is available for use in this mode as in all the others.

TOOLKIT

Last of all is the Toolkit menu. It has a miscellany of uses, including screen dumps for Epson dot matrix and Integrex colour ink-jet printers, a mouse speed adjuster, and the text addition option. The latter has access to supplied and user-defined fonts for fancy text-work to complement your artistic efforts.

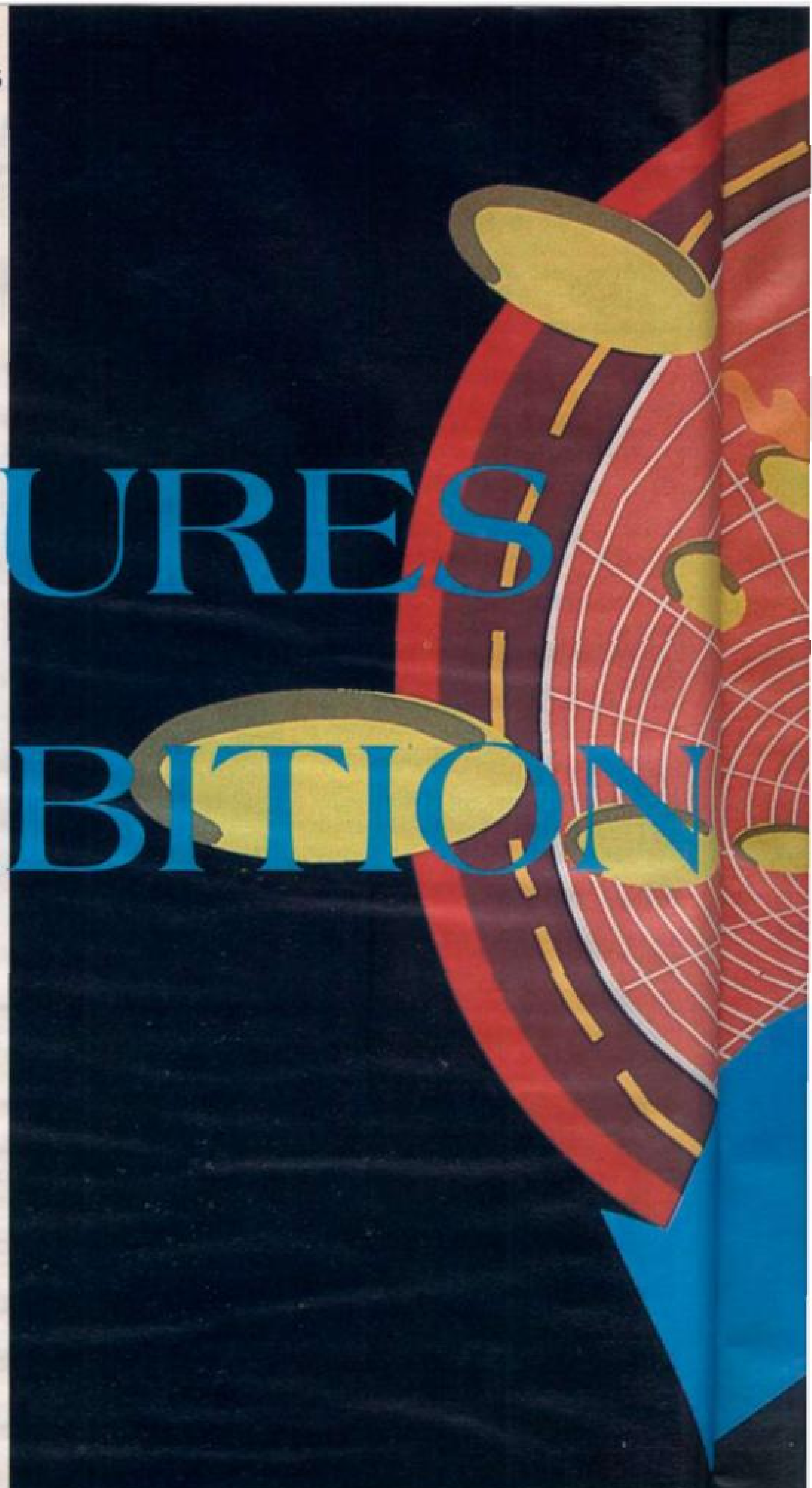
Another interesting feature is an edge detector. This seeks shapes and converts them to mono, although I am not sure how useful that is. Finally there is the DISTORT facility. It lets you cover a selected area with a rectangle marked by six dots, three on each side. Each dot can be pulled away from its default position to distort the rectangle and thus the object originally covered by it. At first it seemed like a very useful idea but six adjustment points is a little too limiting for useful effects.

The painting facilities available in Artisan are good, through probably not up to the standards set by some Commodore Amiga or Atari ST systems, especially considering the potential of the Archimedes. There are no colour-switching animation facilities and the limit of 16 colours can often be frustration; there are no built-in 3D effects and you are restricted to a single screen-sized canvas.

Luckily there are some good banding and block manipulation facilities to strengthen Artisan. The package is a great improvement on the useful free item supplied on the welcome disc but I expect to see better packages appear before long.

Overall, not bad especially as large portions of the code are in Basic, but the fact that this is the first commercial art package for the Archimedes inevitably means that the competition will aim to better it.





PICTURES at an EXHIBITION

THE FUTURE LOOKS BRIGHT FOR GRAPHICS, AS CHRIS JENKINS DISCOVERED AT CG '87.

As far as most "home" computers are concerned, the main application of graphics is in the production of ever more colourful games. For the exhibitors at Computer Graphics '87, though, graphics are big business.

Like the seven shows preceding it, CG '87 went largely unmarked by the home computer press. Indeed, the only "home" computer represented there was the Commodore Amiga; most of the other systems on show were in the £20-£50,000 price bracket, although the results did justify the expense.

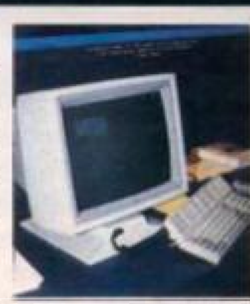
The Wembley Conference Centre played host to over 150

● **Above: a business presentation graphic from Dicomed, produced on a workstation capable of 8000-line output.**



exhibitors, showing everything from ultra-high resolution monitors to CADCAM workstations to computer/video systems designed for the most exacting television work. There was also a series of seminars, a computer animation film festival and technical lectures. The exhibition was surrounded by images created entirely on computers, which captured (with varying degrees of success) the skill of the traditional paint-and-paper artist.

Computer graphics systems fall into four broad categories: business presentation, imaging (transferring graphics to other media), pure design and animation. Perhaps the most familiar is business presentation. Systems in this category rely very heavily on standard mini/micro hardware such as the IBM PC-AT. For instance, Genigraphics produces a system running on a PC

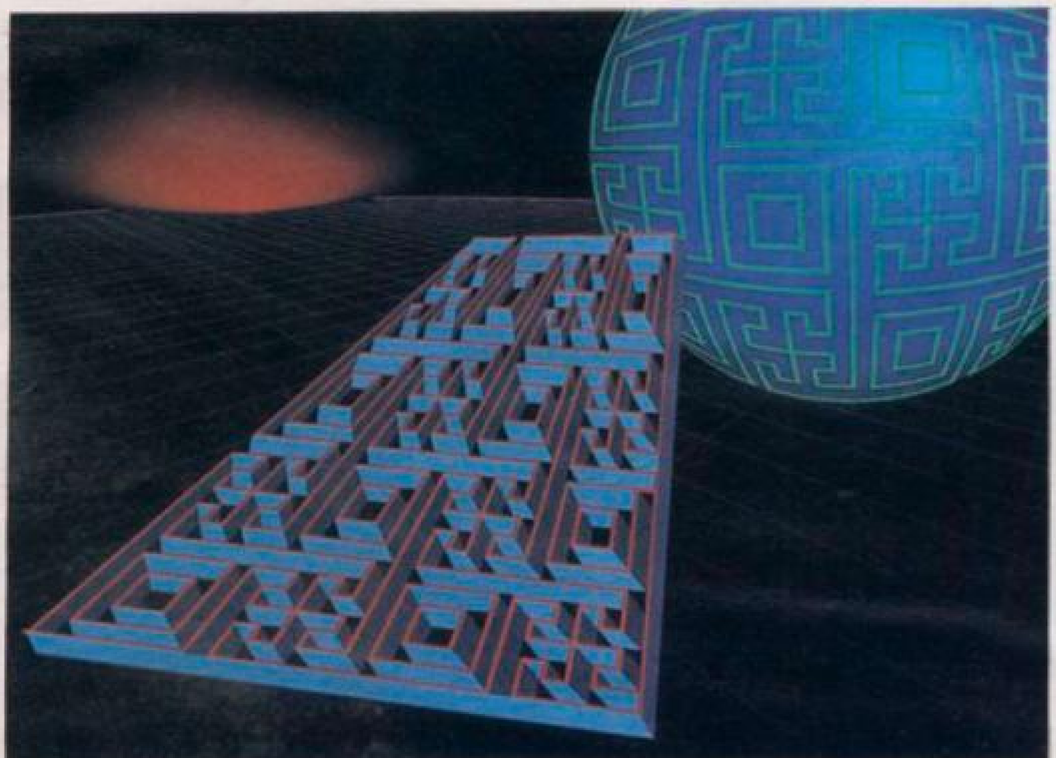


● **Above: the Whitechapel Hi-Tech-10 has the power of ten VAX 11/780s.**

which provides fourteen different types of chart, including line, x-y, multiple bar, pie, double pie, table and tree, a selection of colour palettes and a user-friendly form-fill interface for entering data.

Dedicated workstations are more flexible and creative but they tend to cost a great deal. Most such systems consist of a high-resolution colour monitor for displaying the graphics, a mono monitor for controlling the art software and a large amount of processing and storage power.

The *Art Electric Art System One*, for ▶



● **Above: the French group Dalim has introduced several innovations in 3-D modelling techniques.**

instance, is a £15,000 entry-level presentation graphics workstation. It can produce either vector images created using straight lines or raster images (built up from dots like a television picture). Standard features include 22 typefaces, smooth shading routines, variable light source effects and resolution up to 1024 x 768 pixels. There are options for video image capture, interfacing with other CAD and desktop publishing systems, and storage to floppy, hard or optical disc.

Many similar systems are aimed squarely at the graphic designer rather than the businessman. Letraset – the company which brought you rub-down transfers – has a successful system called *The Illustrator* which is an art student's dream. It can run on a PC-AT and includes a 20in. colour monitor with 1024 x 768 pixel resolution capable of displaying 248 screen colours from a palette of 16.7 million (!), a mono monitor running the command software and a "digi-pad" tablet-and-stylus system. Information can be inputted from the pad, a 300 dot per inch colour picture scanner, or a video source. A huge range of icon-based graphics functions can then be accessed to produce geometric, brush, airbrush, pen, mask, cropping, cut and paste, and hundreds of other creative effects.

USER-TRANSPARENT

Images produced by Illustrator can be as "realistic" or as "computerish" as you require; the point is that the system is user-transparent, and doesn't impose a particular style on the artist.

Illustrator can output to 35mm, 4 x 5in., or 8 x 10in. film, colour paper copy, or DTP systems. A huge sub-industry has grown up around the need to transfer computer images to other media such as film, overhead projector acetate and paper. High-resolution digital cameras such as Agfa's *ImageCapture* system can scan an image with 4096-line resolution, store it on hard disk or transfer it to film or video.

New at the show was the *Ramtek 4327* series. This high-performance system features 1280 x 1024 pixel displays, using 256 colours from a palette of 16.7 million (what is it about that number?). Based on a Motorola 68010 processor, the Ramtek can handle ten simultaneous image planes and has a 20 million instructions per second transform-and-draw processor, allowing fast manipulation of graphically "primitive" geometric shapes. Its baby brother, the 4322, has only 4.5MB of RAM and 4096 colours to choose from.

Even that performance pales in comparison with the *Dicomed Producer XP Design Station*, a £52,000, 46MB graphics workstation capable of 8000-line output. Compare that with the 625 lines of a television picture to get some idea of the precision and clarity of the system.

Many such systems – and others more precisely tailored for specific applications – are used for technical applications such as computer-aided design, fluid flow modelling, thermodynamics, geographical simulations and statistics. For the most precise technical work, users insist on monitors with unbelievable specifications. For instance, the Conrac 7250 automatically locks to any of the standard horizontal scan rates, with variable resolution up to 1024 x 1024 pixels. It also features a 0.31mm dot pitch.

The most familiar application of computer-generated images is in advertising. Because computer images can be updated and edited easily, and because they give non-artists access to sophisticated techniques, the high-gloss look of computer art is now seen everywhere, from cereal packets to magazine logos. Advertising agencies vie to spend more and more money on creating striking images; for instance, fractals, where every computer technology have to spend more and more to keep up with the latest trends. Fortunately, this stimulates research and results in progressively more impressive images.

The techniques dominate the commercial computer graphics scene. One is pure design/animation, where the computer artist starts from scratch; the other, digital video, where the aim is to use computer technology to manipulate images of reality.

IMAGES

Huge amounts of computer time and processing power are necessary to create the most striking images, using machines costing in excess of a quarter of a million pounds. Various abstruse mathematical theories are pressed into use to produce the most convincing images; for instance, fractals, where every object is expressed as a deviation from a standard grid; vector graphics, where the image is composed entirely of straight lines drawn from a list of co-ordinates; ray tracing, where reflections in semi-transparent objects are painstakingly calculated; and, most impressively, bit-mapped or solid polygonal modelling. This year's buzzword was "radiosity", a technique by which reflected light in images can be programmed to "bleed" or "blush" more convincingly. The most impressive demonstration, by Amazing Array products, showed a series of semi-transparent spheres wrapped around with subtle marble textures.

Even the most powerful computers in the world, such as the Cray XM-P 1, cannot produce real-time animation at the resolution required for much commercial work. In the film *The Last Starfighter*, for instance, the spaceship images contained up to 400,000 polygonal shapes. The separate frames took five minutes to generate; they were then photographed in series to create the effect of movement.

More recent examples, such as the title sequences for television programmes like *Sportsnight*, *Weekend World* and *Opportunity Knocks*, or adverts such as those for *Smarties*, are produced using top-of-the-range workstations from Tektronix, Abekas, Sun and other companies. The Smarties ad, for instance, shows a flying camera view of a twilit sports arena full of athletic sweets. Over thirty indi-

vidual light sources were synthesised to create the final images.

Even more impressive are the digital video systems such as *Quantel Paintbox, Harry* and *Mirage*, which can combine computer-generated and video images to produce stunningly realistic (or unrealistic) effects. Agencies like Digital Pictures use these with mainframes such as the Data General MV10000SX. This system is connected to a Silicon Graphics IRIS 2400 real-time animation suite to produce computer models of real objects and combine them with live action using "matte" masking techniques.

A new system, *Matisse*, uses genlock techniques to synchronise computer images with video. Using a 32-bit pressure-sensitive pad, it is then possible to draw on the video picture, cut, copy, zoom, flip, recolour and introduce 3-D modelling and stop-frame animation techniques.

It is possible to use many of these techniques without spending millions of pounds. The Scottish Amiga Centre showed a system based on the Commodore Amiga 2000 with the standard 4096 colours and maximum 640 x 400 pixel resolution. Available as optional extras were an upgraded central processor, additional maths co-processors, 5MB RAM expansion, high-resolution monitor, 40MB hard disk storage, video genlock hardware, a graphics tablet and animation software such as *Sculpt-3D* and *Forms in Flight*; you could put together a pretty impressive system for around £10,000.

ROBOT

Ironically, just around the corner from the Amiga Centre was Whitechapel, showing the HiTech-10 workstation. This monster managed to run the famous Amiga juggling robot demo in a small window, while simultaneously zipping backwards and forwards at ten times normal speed through a frame-grabbed sequence from *Raiders of the Lost Ark*. The Hi-Tech-10 is a £25,000 RISC-based machine with the power of 10 VAX 11/780s.

While American and British companies lead the world in hardware and software, the French and Italians seem to produce the most artistic results. Milan-based Eidos showed stunningly realistic interior design images, but my favourites were generated with Tektronix graphics hardware, running on Tandon PCs, by the French group Dalim.

Closely associated with pioneering research institute SOGITEC, Dalim is responsible for many innovations in 3-D modelling technique. Dalim images combine artistic flair with theoretical expertise to produce stunning results; perhaps not the most technically advanced pictures on show, but in many ways the most satisfying.

Notwithstanding the inevitable expense of hardware such as high-resolution monitors, it seems inevitable that within the next few years such impressive systems will be available to any half-serious artist. Acorn's RISC-based Archimedes, Atari's projected transputer project, and existing systems such as the Amiga and Atari ST, will sell largely on their display and manipulation of computer and video graphics.

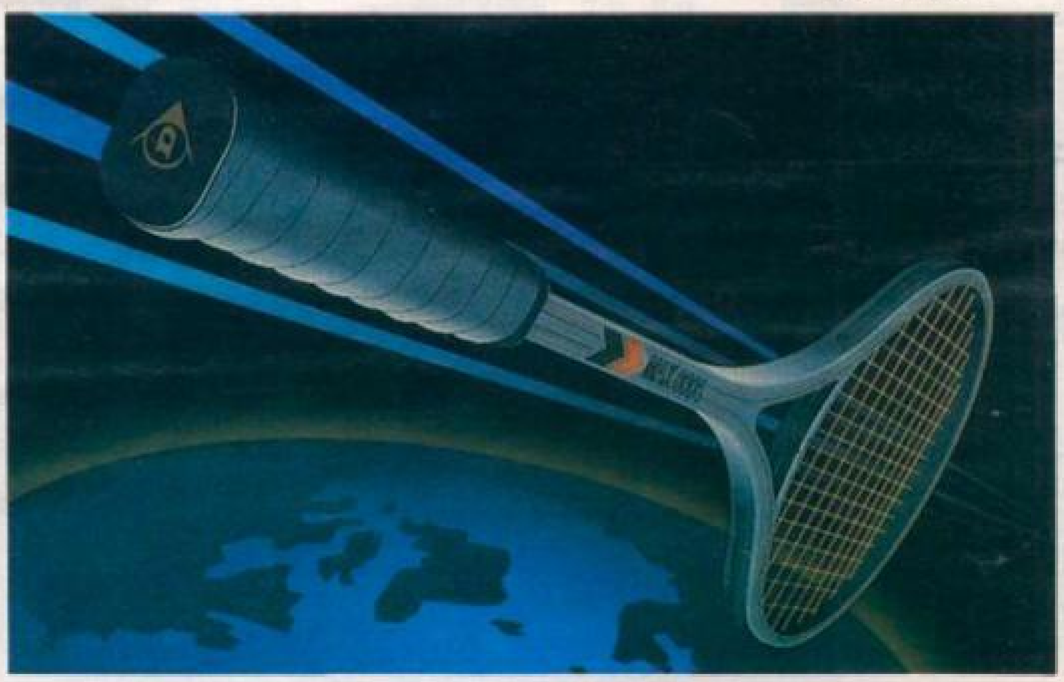
The Computer Graphics Show 1988 might well be aimed at the masses, not just the elite.



● Above: this amazing technicolour dreamboat is an example of the more realistic output from Dalim.

PICTURES at an EXHIBITION

● Below: graphics as good as this will soon be available to everyone.



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NOMINAL LEDGER	AMSOFT	33.00	29.70
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PC GAMES

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BORROWED TIME	ACTIVISION	19.99	17.99
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FRONT DESK

Buffered interface for C64



● The 8K version of the *Comprint* buffered interface from Micro Control Systems.

Micro Control systems of Nottingham has launched an 8K version of its *Comprint* buffered interface, thus allowing Epson and Canon printers to be attached to the Commodore 64, SX64 and 128.

The new version of Comprint has been issued to help overcome the problem of the Commodore bus system and its non-standard character set. This makes it incompatible with many printers. Comprint is designed around a code translator which makes an Epson or Canon printer behave exactly like a Commodore device.

The 8K Epson version costs £34.99 and the Canon version £44.99. Micro Systems has reduced the retail price of its version to £29.99 and £39.99 respectively, the stand alone device being cut to £79.99. Dr. Richard Tavener will answer your queries on Comprint on 0602 391204.

Speaking in many tongues

An opportunity to break down the Tower of Babel has been presented by Ink International in the form of a multi-lingual dictionary for the PC. For those with a large volume of European correspondence, five languages are covered: French, German, Dutch, Italian and Spanish. Also included are a general business dictionary of 2,000 terms and the option of 500-word specialist dictionaries covering specialist terms.

The package is called *Term Tracer* and provides the ability to consult, edit and create dictionaries while editing. It also includes two keyboard enhancers. Exkey allows for the usage of accented characters. European punctuation symbols and Greek and mathematical symbols. A text macro facility allows a string of up to 45 characters to be stored under one key combination and recalled at any time.

The standard Term Tracer package costs £95 and additional dictionaries are £29 each. Telephone Paul Noble on 0272 299083 for further information.

Case of the disappearing keyboard

Accodata has solved the problem of limited desk space caused by large PCs. *Keyboard Slideaway* is a keyboard drawer which fits under the body of the computer. When the keyboard is required, it slides out of its drawer telescopically and acts as an extension to the work surface.

Keyboard Slideaway will fit under any PC and can take any keyboard up to a depth of 8ins. It is made of aluminium and finished in a light grey colour. Retail price is £49. Telephone 0732 885555 for further details.

Advanced desk top publisher

Advanced Memory Systems has launched a desktop publishing program system for the PC. Named *Finesse*, it retails at £99 and is touted by its manufacturers as a package similar to *Ventura* but with the more complex facilities removed to allow greater ease of use for home users.

Finesse complements the Advanced Memory Systems DTP package for the Commodore 64. Called *Stop Press* in this country, the £39.99 program – or £69.99 with a mouse – has now been released in the United States with the name *Outrageous Pages*.

Call in the Professionals

Integrated software package *Mini Office II* has been converted for the Amstrad PCW and re-named *Mini Office Professional*. Included in the package are a word processor – which Database Software claims to be faster than *LocoScript II* – a database, a spreadsheet, a graphics program and comms capabilities.

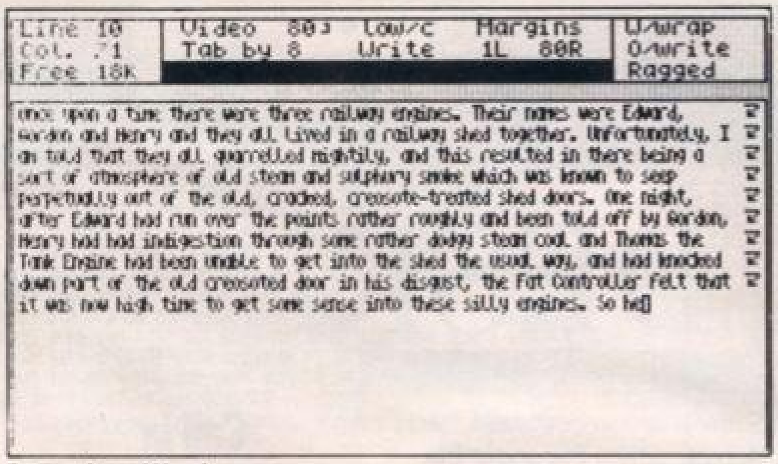
The two discs which comprise Mini Office Professional are written in machine code to give a faster response.

The aim is to make the package truly integrated so that, for example, graphs can be drawn using information from the spreadsheet, names and addresses can be merged from the database into the word processor to perform mailmerging tasks and reports can also be sent by telephone using the comms package.

A 70-page ring-bound manual completes Mini Office professional. it costs £29.95. For further information, write to Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. The March issue of *YC* will carry a full review of the product.



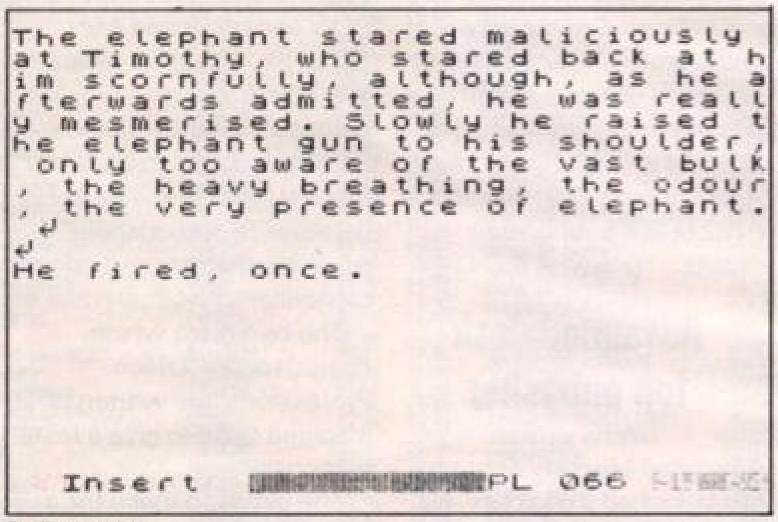
● Keyboard Slideaway is a useful device for saving desk space.



● **The Last Word**



● **Mini Office**

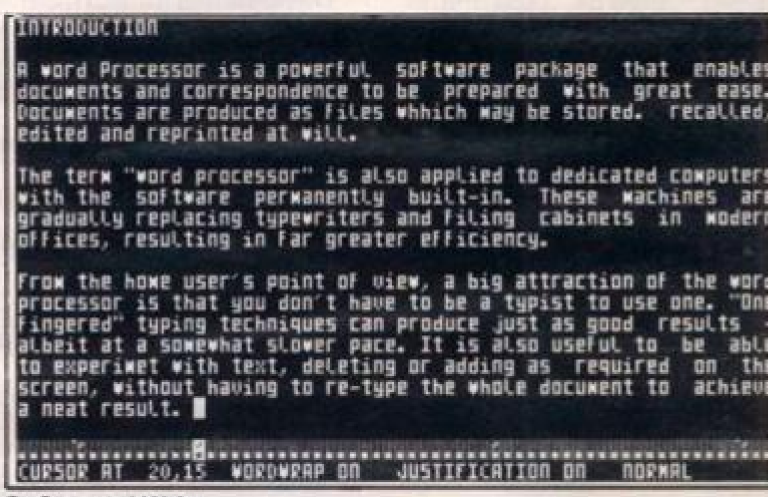


● **Ramprint**



● **Tasword +2**

THE SPECTRUM IS UNDER-ESTIMATED AS A WORD PROCESSING MACHINE, SAYS JOHN WASE. HERE HE REVIEWS EIGHT PROGRAMS IN SUPPORT OF HIS ARGUMENT.



● **Spectral Writer**

A WORD IN YOUR SPECTRUM

Word processing does not require much computer power. *PipeDream* on the new Z-88 uses exactly the same Z-80 chip as all versions of the venerable Spectrum. Thus the Spectrum, too, should, in theory, provide good word processing facilities, although in practice there are limitations like memory. A 48K Spectrum has around 41K for both program and text file, around 110K for the 128K version, and the screen display at only 32 columns.

Nevertheless, I found eight readily-available packages, plus variants for various models, of assorted prices, features, sophistication and complexity. Each has been written with some particular purpose in mind and all have virtues and vices associated with what is, after all, a compromise, for no word processing program suits everyone or all applications.

The constraints of the 32-column screen are overcome in a variety of ways. In some programs text lines continue along a second or third display line and end with some recognisable symbol, while in others the screen is re-defined to up to 80 characters per line, further augmented by multiple lines or sideways scrolling, giving as many as 148 characters per printer line.

While it is possible to provide a good deal of the information about the packages in tabular form, it really gives little feeling for the strong and weak points, the aims and the overall success of each package. Therefore I have chosen a combination of tables and comment to provide sufficient information to guide you in choosing packages suitable for your needs. The packages are *Mini-Office*, a suite of programs for younger children; *Ramprint*, an add-on printer interface with integral word processor; *Spectral Writer*, bundled with *Wafadrive; WordMaster; Word Manager; The Last Word; The Writer* and, finally, the *Tasword* family. They are listed in table one, along with the outstanding features of each package, the cost and supplier.

The easiest thing to do is to take them in groups. First, **Mini-Office,** which has a very simple set of instructions on a cassette-sized book; interpretation by an adult will be necessary. There is a simple test piece to be typed-in; it appeared in big letters an inch or more high in yellow on a black background on my old TV; it is very easy for a child to write a simple letter but with very little more scope.

The normal mode is insert and there is also a crude copy, so letters or lines can

Table 1. General features and sources of programs

Program	Version	Availability	Price	Intent	Source
Mini-Office	—	Cassette.	£5.95	Children's suite (5-9 years).	Database Software, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. 061 456 8383
Ramprint	—	Printer interface with built-in word processor.	£34.95	Simple program, adequate for letters.	Ram Electronics (Fleet) Ltd, Unit 16, Redfields Industrial Park, Redfield Lane, Church Crookham, Aldershot, Hampshire. 0252 850031
Spectral Writer	—	Wafer – bundled with the Wafadrive – still available from some dealers.	—	Simple program, rather like a slightly improved Tasword 2 with squarer characters. Adequate for letters and short documents.	Logic Mail Order, 17 Leofric Square, Eastern Industry, Peterborough, Cambs. 0733 313870
WordMaster (incorporating Graphmate)	1.03	Cassette – built-in transfer to Microdrive	£14.95	Sophisticated program. Strength in the room left for add-in programs with simple desk-top publishing in mind.	Cardex, 11 Marsh Street, Barrow-in-Furness, Cumbria. LA14 2AE. 0229 36957
Word Manager + 80 (incorporating Mail and Address Managers II)	4.2	Cassette – transfer with one keypress to Microdrive and popular disc systems.	£12.95 Complete package	Sophisticated 48K program – strong on records and mail merge – designed with the Club secretary in mind.	W.N. Richardson, EEC Ltd., 18-21 Misbourne House, Chiltern Hill, Chalfont St. Peter. SL9 9UE. 0753 888866
The Last Word	SP2 1.0 SP3 1.0	Cassette. Instructions provided to modify Basic for Microdrive or any popular disc system. Spectrum +3 disc.	£13.95 £19.95	Straightforward sophisticated 48K word processor, 80-column screen, user-friendliness and clever interaction with Basic particular features.	Trojan Products, 166 Derlwyn Dunvant, Swansea, SA2 7PF. 0792 205491
The Writer 48K The Writer 128K The Artist 48K The Artist 128K The Filer (pre-issue issue review copy).		Cassette. Will convert to most popular disc systems. No +3 version yet.	£14.95 £17.95 £14.95 £17.95 —	Straightforward sophisticated word processor. Will combine graphics like pictures or plans with text. 128K Pagemaker facility better for this. Good for simple DTP with complex pictures.	Softek International Ltd., 36-38 Southampton Street, Covent Garden, London. WC2E 7HE. 01-831 1801
Tasword 2	—	Cassette – Basic can be converted to any other system.	£13.90	Simple 48K program – adequate for letters, short reports.	Tasman Software, Springfield House, Hyde Terrace, Leeds. LS2 9LN. 0532 438301
Tasword 3	—	No cassette – Microdrive or Opus disc. Patch available for Disciple*	£16.50 £19.50 £5.95 cass £7.95 disc	Sophisticated 48K program, good for general-purpose use. Makes own files or compatible with Campbells* Masterfile.	
Tasword 128; Tasword +2	— 1.02	Cassette – can be transferred to microdrive. Opus disc. Patch available for Disciple*	£13.90 £13.90 £19.50 £5.95 cass £7.95 disc	Same features as Tasword 3 but greatly-enlarged text file.	
Tasword +3	1.00	Disc	£19.95	Same features as Tasword +2 but modified for spellchecker – extra cost, available about now.	

*From the Micro Shop, 271, Dumbarton Road, Glasgow G11 6AB. 041 334 6163.

be added or deleted; crude tabs complete the features. The main menu offers the usual save, verify, load or options with a further choice of double height, double width, margin setting and characters per line.

It could have been an excellent program to introduce a child to an integrated suite had it been revamped but there are no facilities to use a printer other than the obsolete Sinclair gadget or compatibles, and the other options integrate badly into the word processor. You would need a suitable printer for your child to make the most of it.

The next pair are proper programs, both intended for the serious user, and both released relatively early. **Tasword 2,** a development of Tasword on the ZX-81, provides a 64-character line, a fixed text length of 320 lines – 10-and-a-bit pages of double-spaced A4. **Spectral Writer** is similar but with squarer letters – some say much more legible. In both programs insertion is by opening a word or a line and then re-justifying; there is no auto insert mode.

LINE AND COLUMN

Line and column are given on-screen but there is no word count. The cursor will move by line, character, or to the start or finish of the text; in Tasword 2 it is very slow. Word wrap is automatic, characters and lines can be deleted, blocks can be moved and copied and there is a crude search and replace.

Text can be justified with smooth or ragged right margin and centred and margins can be set for tables but there are no tabs in Tasword 2 and no headers, footers or auto-page numbering, no mail-merge, conditional printing or macros; just start and finish lines, one copy only. You can put eight printer codes in the program at once and change them whenever you like.

Both programs are good, straightforward, very simple word processors. You can achieve professional results very quickly. Spectral Writer scores by having tabs, a line-end bell and is a little slicker

"There is no need to buy that new Amstrad or PC-compatible if all you want is a word-processor."

but it normally is only bundled with Wafadrive; Tasword 2 is ubiquitous and bundled with Microdrives.

The chief advantage of both programs is that they are very simple; much is in Basic and is easily user-adapted. The major disadvantage is that printer control codes in the text destroys WYSIWYG concept unless you adopt low cunning or a patch. For simple letters of only a few pages they are easy and adequate.

The other processors are, in general, more sophisticated and it is probably easier to deal with their main features in a large table and just comment briefly on their strengths and weaknesses. The simplest is probably Ramprint, a printer interface and joystick port with a built-in word processor on ROM. I found the documentation brief but the gadget easy to use.

Although it contains most features one needs, there are disadvantages. It will work only with tape or Microdrives, for instance, and it will display only 32 columns when you are entering text, making complex work almost impossible, although it will display a 64-column screen to show you what the work will be like at the end.

That apart, having the works in an EPROM means that there is no software to load; plug it in, type one command and go. For straightforward documents, also those needing underlining, italics and other such fancy bits, even page numbering, it works and works well.

Word-Master again is for the Spectrum owner who has no discs. It works well with tape or Microdrive and an EPROM-driven interface. Within limitations I found a program which was specifically aimed at crude desk-top publishing. The documentation could be improved and I did not particularly like its 64-column character set. A further problem is that right justification could not be implemented on-screen, although was satisfactory when printed; that does not help DTP layout.

Against that, several files can be held in

Table 2. The pros and cons.

	Ramprint	Word Master	Word Manager	The Last Word	The Writer	Tasword
Text length (words)	6,556	4,800	3,750	4,000	3,760 (48K) 5,500 (128K)	2,943 (48K) 10,922 (128K)
Maximum line width	64 chars	255 chars	128 chars	148 chars	127 chars	128 chars
Mode	Overwrite (insert available)	Overwrite (insert available)	Overwrite (insert available)	Overwrite (split word or line, then insert)	Insert (overwrite available)	Overwrite (insert or split line available)
Help in program	No	On-screen	On separate screen	On-screen	On-screen	On-screen (optional)
Word count	No	Yes	Yes	No	No	Yes
Page break display	No	No	No	No	(In menu)	Yes
Word wrap	Yes	Yes	Yes	Yes	Yes	Yes
On-screen justification	Only on display screen	Ragged right only but will print right-justified	Only after completion of paragraph	Yes	Yes	Yes
Block move	Yes	Yes	Yes	No	No	Yes
Block delete	Yes	Yes	Yes	Yes	Yes	Yes
Block copy	Yes	Yes	Yes	Yes	Yes	Yes
Block save	No	Yes	No	Yes	Yes	No
Autonumber	Yes	Yes	Yes	Yes	Yes	Yes
Print header	No	Yes	No	Yes	Yes	Yes
Print footer	No	Yes	No	Yes	Yes	Yes
Multiple copies	No	No	Yes	Yes	Yes	Yes
Mail merge	No	No	Yes	Yes	Yes	Yes
Conditional Printing	No	No	Very Limited	From Basic	Yes	Yes

memory at once, page numbers, headers and footers are catered for and printer control codes are handled beautifully, either in a command line – which does not print but affects the text below – or as special characters for the more common sorts, so that H_2O can be printed readily without upsetting justification.

PICTURES

Pictures can be incorporated with the graphic commands and text can be printed either to the right or to the left of it; again, instructions are a little sparse. Graphmate, a separate, stand-alone program, produces bar charts or pie charts easily but with provision for labelling axes left to Word-Master. The programs are independent and the products of Graphmate have to be saved before incorporation.

Cardex also supplied Headliner on a separate tape. It will produce headlines in a variety of styles for subsequent incorporation. This is a useful suite as it stands; further development and the production of disc/128K versions using more interfaces would make it still better.

Word Manager 4 is aimed at a different end-user, evident from its being bundled with Mail and Address Manager II. The review version 4.2 has a number of improvements over earlier issues, including a completely re-written Address Manager II. All saves and loads are in Basic and I liked particularly the single keypress to modify and transfer everything to disc. The 64-column character set looked almost like script, unlike any of the others; I liked it. The normal screen is bright. Lines longer than 64 characters are wrapped round and shown on the line below – not bright.

The instruction book was adequate. Some features were easy to use but I did not like the constant switching between modes to use cursors and delete, the lack of on-screen prompts – particularly caps – or the way in which paragraphs were completed before on-screen justification took place.

Page numbering is there but not headers or footers. Address Manager II is a database specific for Word Manager; Mail Manager takes the text from Word Manager and the names and addresses from Mail Manager and integrates them. There are conditional indices for Mr. Mrs. M/s or Miss but no real conditional printing is available.

For circulation of simple club letters or even, at a pinch, a short club magazine, this would do the trick satisfactorily if you get used to the vagaries involved in editing and, at the price which includes all three programs, it is unbeatable.

In contrast, **The Last Word** has a very well-produced and extensive manual. I found it very easy to use. Again, all the loads and saves are in Basic but you will have to type-in some new lines – supplied – to get it working from Microdrive or disc; a novice might not like this.

The screen display is changeable from 40, 48, 60 or 80 characters per line – not too good on a monitor, better on a large television set where the slight fuzz causes the eye to assume a good deal. It has most of the features one might expect, like headers, footers, page numbers, selected printing from Basic and mail-merge, with its own data files.

"Word-Master is for the Spectrum owner who has no discs. It works well with tape or Microdrive . . ."

Because lines are terminated by a carriage return symbol there is no insert mode; you have to split a line to insert letters or words. Screen refresh is a trifle slow and the program is 48K, although the author says that there is the possiblity of a 128K program in the future.

That said, everything else is good. Control codes do not disturb justification; by screen wrap-around you can get up to 148 characters per line; formatting is very flexible, exiting into Basic to insert your own routines is encouraged and examples given.

Tutor files loaded from tape help you to learn to manipulate text and load and save mail-merge information. Although I had never used it previously and am very familiar with another processor, I found the keys logical and liked the program.

NO COLOURS

The Writer is in two versions, 48K and 128K. Although Softek was very helpful on the telephone and promised to send both programs, plus *The Artist*, plus a pre-release version of *The Filer*, they did not arrive in time for this review. Fortunately I was able to borrow a 48K version of The Writer. It is well-presented with a good instruction book. No colours are used; the screen is uniformly white letters on a black background and looks very smart.

The 64 characters a line lettering is clear, square – rather like Spectral Writer – and easy to read. The normal text manipulations are on symbol or extended mode and the program starts in insert mode. Press "Edit" and move the arrow over the top-line menu; up comes an overlay menu with obvious choices for all the things like file handling, saving and so on.

Printing includes mail-merge, conditional printing and can include calculations. All in all, a very impressive package. I found it easy to use, too, and liked it. The 128K version contains a pagemaker facility which imports pictures from The Artist. I had hoped to be able to look at this, too, and compare it to the Word-Master DTP facilities.

Finally, the **Tasword** series. Tasword 3 uses the same black on white character set as Tasword 2 – adequate and readable but scarcely exciting – but there the similarity ends. Because, unlike several of the other programs, all loads and saves are in machine code, there are a number of versions to fit various machines and devices, including Microdrive, Opus and Disciple discs, but there is no tape version, because to fit in all the features and still keep a respectable length file, the main menu is fed in as an overlay; it is frustrating to have to wait seven seconds for it to load from Microdrive or Opus.

All the standard features are present; mail-merge from Masterfile or from its own address lists produced from within the program, headers, footers, pagination, plenty of control codes to send, print several text files sequentially, print multiple copies, customise program, overtype – standard – or insert mode, word count, space remaining – do not fill it too tightly, though.

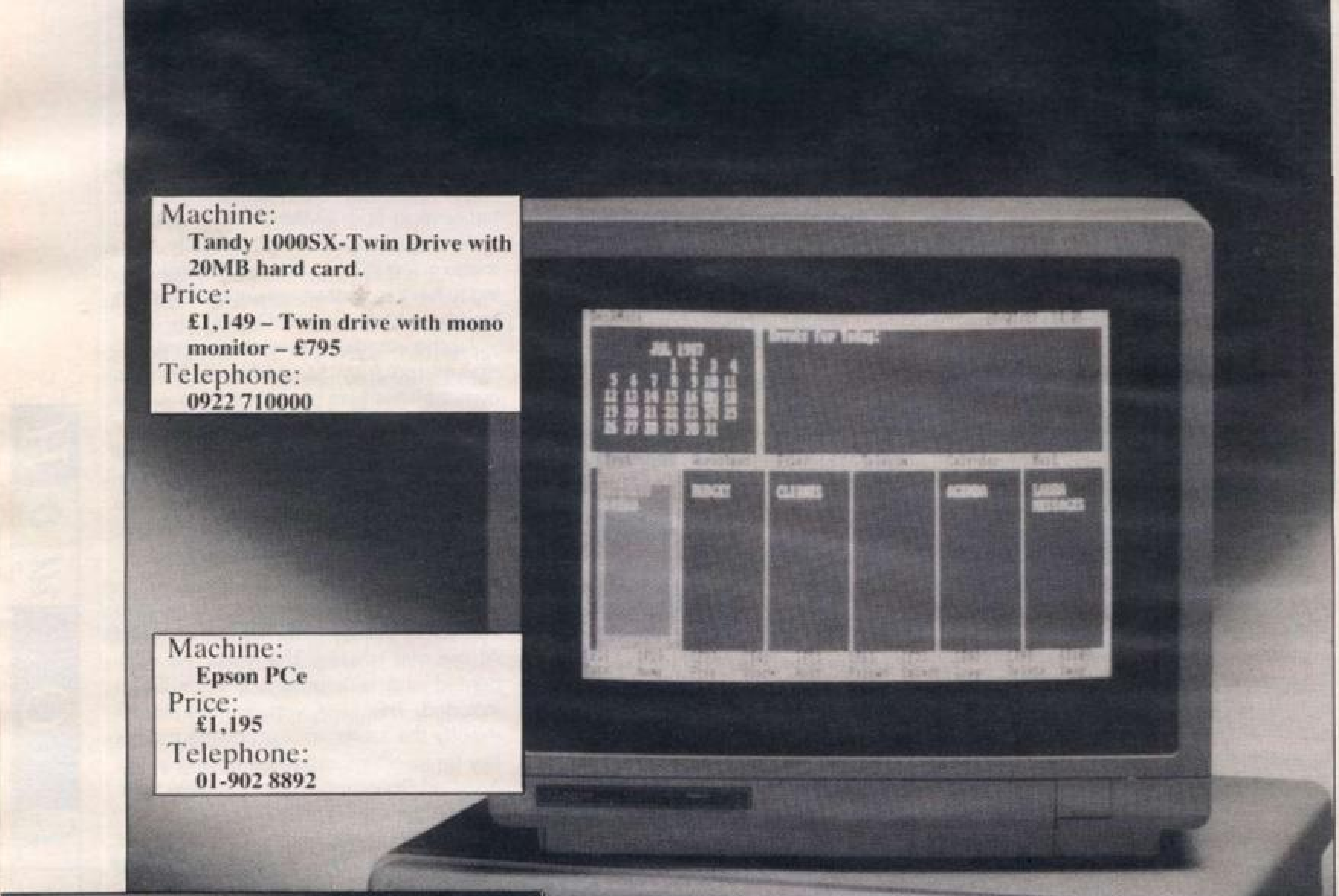
The main menu is, like all the Spectrum Taswords, accessed by symbol shift and A; the rest is easy. The manual is well-printed and laid-out and a tutor file is included. The 128K versions are almost exactly the same, except for the control key for insertion and some tidying as the Amstrad Spectrums no longer have symbols on the keys.

The main menu appears instantly and the text file is large, between 40 and 50 pages of double-spaced A4, which is a tremendous advantage if you write complicated documents and need to keep referring to what has gone before. The new +3 version appears similar to the user but contains code enabling a spellchecker to work and the extended mode bug which locks the main menu has been fixed.

The biggest disadvantage is the lack of justification when control codes are inserted – redeemed by a patch from Seven Stars Software; against this is the ease of use and the fact that Tasword and Masterfile are both available on a range of machines, even PC compatibles. Again, I liked Tasword; it works well and is good value.

Compared to most other machines, the choice of word processors on the Spectrum is wide and some are technically very good. There is no need to buy that new Amstrad or PC-compatible if all you want is a word processor, particularly if you have a +2 or a +3 with their good keyboards. After all, Tasword is very similar on the PC. Moreover, the PC will not play budget games as well when you are not using it.

EPSON vs TANDY



Machine:
Tandy 1000SX-Twin Drive with 20MB hard card.
Price:
£1,149 – Twin drive with mono monitor – £795
Telephone:
0922 710000

Machine:
Epson PCe
Price:
£1,195
Telephone:
01-902 8892

GEOF WHEELWRIGHT COMPARES TWO PC CLONES WITH 20MB DISCS FROM EPSON AND TANDY.

Competition in the personal computer market is now more intense than ever, with more and more companies crowding into all sectors of the business. This is particularly evident in the low end, where there has been a massive growth in the number of sub-£1,500 PC and AT clones from major manufacturers such as Amstrad, Dell, Epson, Tandon, Tandy and Zenith.

While Zenith, Tandon, Dell – and most of all Amstrad – have been making splashes with their latest offerings, the new low-cost PC clones from Epson and Tandy have crept quietly into the shops. They did not move quietly enough, however, to go unnoticed by the *Your Computer's* team of eagle-eyed cheap PC-spotters.

Epson, for example, managed to get a fair amount of publicity about its new AT clones, but in all the upmarket noise many failed to notice the introduction of the humble little PCe, an 8088-based compatible which sells with 640K RAM, 20MB hard disc and monochrome Hercules-compatible display for £1,199. That puts it within about £100 striking distance of the Amstrad PC1512 and PC1640 and certainly gives Epson credibility as a low-cost PC supplier.

In specification terms, however, the PCe is not so humble. To start, you get a processor which runs at between 4.77 and 10 MHz making it one of the fastest dual-processor XT clones in this end of the market. Amstrad PCs use the more conventional but slower 4.77/8 MHz processors and are thus outpaced by the PCe.

Nor, with a full 640K ram on the basic motherboard, is the PCe a slough for memory. Unlike the PC1512 you do not have to pay extra to get the full complement of DOS-supported main memory with the PCe although, it must be admitted, you get 640K on the PC1640 and most other XT clones.

The PCe hard disc access time, is a little less impressive, although by no means out of the ordinary. The company quotes an average time of some 69 milliseconds, about par for an XT drive but slow compared to the 40-ms or 28-ms access time which can be achieved with that of a well-heeled AT clone from Dell, Compaq or even Epson.

The PCe does not, however, fare much better than the PC1640 in expansion terms. Like the Amstrad machine, it includes parallel and serial ports but you would think this might give the machine an edge – it has five expansion slots. Only three of the slots are free once you have added the display adaptor and hard disc controller standard with the machine.

KEYBOARD

The keyboard is the type we will all have to become used to within a year or two but one with which I still have problems. It is the AT enhanced keyboard layout, featuring the CAP LOCK key where the CTRL key used to be, 12 function keys instead of 10, and a wider variety of choice on the cursor control keys located both on the numeric keypad and as part of their own separate cluster.

Because the keyboard design is standard does not mean the same can be said of the rest of the machine. We were grateful for its small desk-top footprint and the accessible controls such as front-mounted re-set switch, keyboard plug and DIP switches, for which Epson has become very well-known.

Finally, Epson offers its user interface add-on option which is exceptional in the PC environment. Taxi 2 sells for £150, and another £50 if you want to buy the Epson mouse to go with it and provides a complete Macintosh-style desk-top environment in which you can operate PC applications.

Unlike either Microsoft *Windows* or Digital Research GEM, however, Taxi 2 is not designed to run applications which have been written to take advantage of the Taxi interface. Rather, it allows you to tailor existing applications, such as *WordStar*, to use the mouse and some Taxi pop-up menus, which can be created in such a way that the pop-up menu choices replace the keyboard commands.

FAST

The PCe looks to be a good choice. It is well-specified, fast, built by a major manufacturer and has sufficient interfacing and power to provide a prospective owner with excellent value.

Epson still has competition – and not only from Amstrad. Tandy, for example, claims to be the second biggest seller of PC-compatible computers in the U.S. with its Tandy 1000, 3000 and 4000 range of PCs being sold throughout Tandy high street retail shops.

In terms of looks and style, the 1000SX has more in common with the old Tandy 1000, one of the first sub-£1000 PC clones, than the also new Tandy 1000EX and 1000HX machines but it is a new machine inside.

The specifications and pricing are fairly impressive and not too dissimilar from what is offered by Epson. You get the same amount of RAM – 640K on the main board – a 20MB hard disc – a hard card designed specially for the machine – two 5.25in. floppy disc drives and an 8088-2 processor running at both 4.77MHz and 7.16MHz. In addition, you have a parallel port, joystick socket and even an audio output socket. You have to pay extra for an RS232 interface.

Unlike the Epson machine, the 1000SX includes some applications software in its £1,149 price for the same type of monochrome 20MB system with display you would get from Epson.

This is the latest implementation to the company's Deskmate software – Deskmate II, which includes limited word-processing, spreadsheet, database, communications, calendar and electronic mail functions.

DRAWBACKS

There are, however, still many drawbacks to the 1000SX which are hangovers from the days of the original Tandy 1000. The first is simply the shape of the machine – which is slightly less deep than a standard PC and thus requires that you only use short expansion cards if you want to add to the interior of the machine. Thus any cards more than 10 inches long will not fit inside the 1000SX.

This includes most internal modems and a number of the Above Board RAM expansion cards. For most purposes, however, you can either find a half-sized card to fit inside the 1000 or get one from Tandy. But that is nowhere near as convenient as being able to rely on buying any standard PC expansion board and knowing that it will fit.

Tandy has also maintained its old, idiosyncratic keyboard on the 1000SX, which puts a lot of keys that you would expect to be in one place, such as the INSERT and DELETE keys at the bottom right-hand corner of the numeric keypad, in another. It does not conform to either the old XT keyboard standard or the new AT enhanced keyboard standard used by the likes of Epson and PS/2.

Finally, the processor. At between 4.77MHz and 7.16MHz it is still somewhat slower than that offered by Epson and even the Tandy low-cost 80286 machines, including the very well-priced 1000TX system.

There is not much to compare beween the Tandy and Epson systems. The Epson machine seems better-built, more modern and looks to be a good deal faster than the Tandy offering. It also offers more standard expansion, more important interfacing – choosing to include a serial port as standard rather than a joystick port – and a better overall appearance.

ST Update

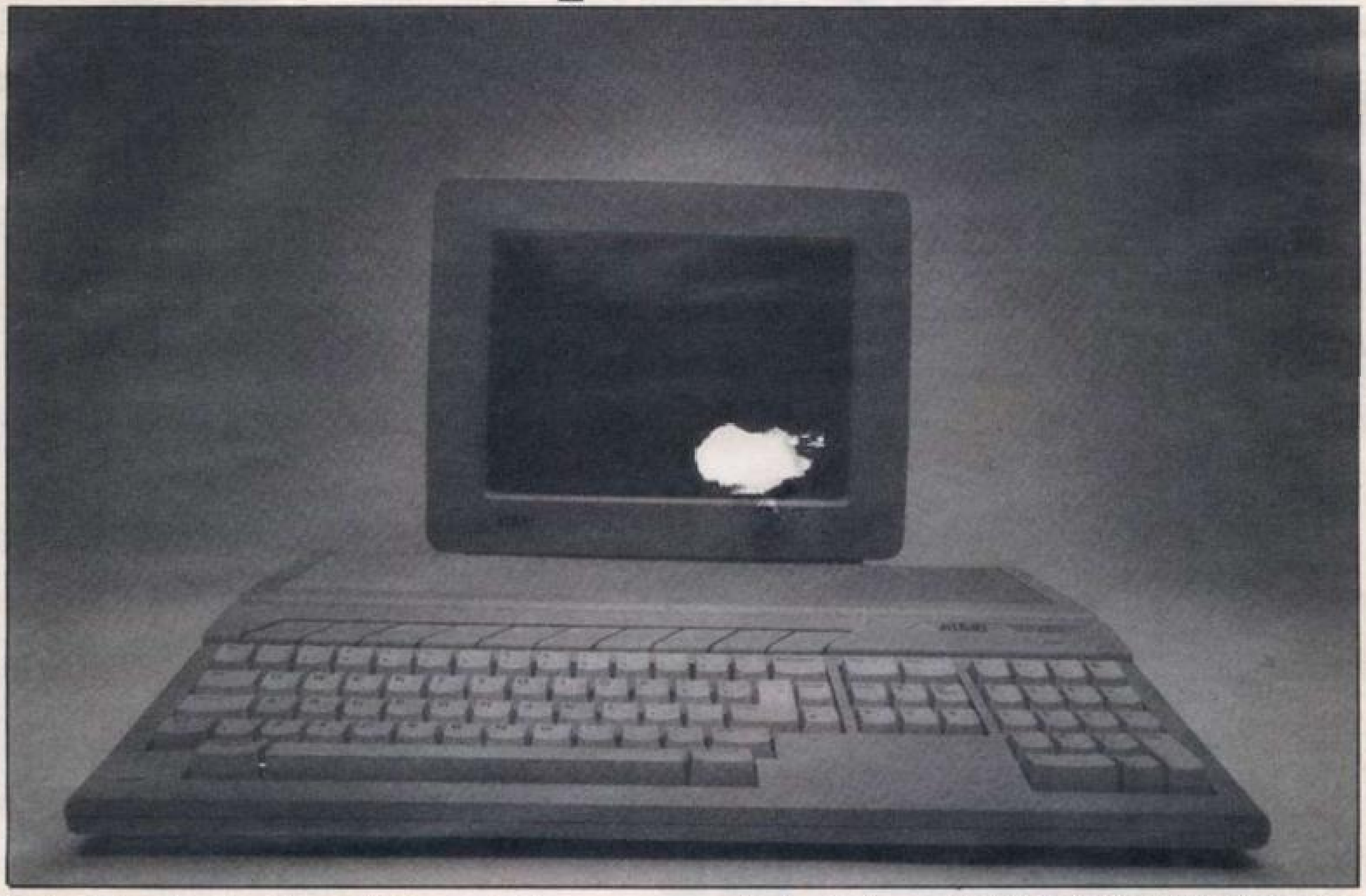


OBLITERATOR
EXCLUSIVE PREVIEW

GALLERY: ART ON DISPLAY

GRAPHICS TUTORIAL: MAKE THE MOST OF DEGAS

The latest Update



Evesham Micros has released an Atari ST Update kit which extends the memory of the 520 ST FM to 1MB for £59. An installation service is also available for an extra £15.

Evesham managing director Richard Austin said, "We believe that the update kit represents the best possible option for people who already own a 520 ST FM, but are hitting problems caused by the constraint on memory. We even urge those who are on the verge of buying their first ST FM to consider our product instead of splashing out on the full 1MB version".

● **The ST Update kit extends the 520 memory to 1MB.**

Metacomco assembler

Metacomco has released a new version of its popular macro assembler for the Atari ST. The new release, version 11.1, will provide a complete development system for 68000 assembly language programs. Features include a faster assembler, a new link/loader, symbolic debugger, resource construction editor, make utility, enhanced screen editor and enhanced menu+ shell program.

Andrew Spencer, Metacomco product manager said, "We have produced the best assembler development system for the ST around". The original macro assembler manual has been rewritten to include full explanatory documentation, examples and tutorial sections.

The package costs £49.95. Those who wish to upgrade from the old version can do so for £29.95.

Microdeal launches new product range

Microdeal has announced a new range of Michtron products. *Master Cad* is a complete set of design tools, which makes designing a simple and enjoyable task. It allows the user to project a design made in two dimensions into 3D. Price is £149.95.

Invasion Alert is a new educational game designed to improve basic typing, spelling and maths skills. The only defence and the only way to prepare for the invasion is to improve your abilities continuously. Screaming sirens sound if your defence is inadequate.

You can create, add to or modify the content of the game by using the special programming feature. Price is £14.95.

GFA Artist is an easy-to-use art program. It is contained on two disks one of which contains the program plus four fonts, while the other contains demo-files. GFA Artist allows you to use 1000 colours, animation, colour cycling and sprites. A 1MB Atari is needed. Price is £49.95.

Is anyone out there?

A new IO card will allow ST owners to access the outside world in laboratories, factories and the home. The STOIC system plugs into the ST cartridge port, without internal modification and gives the user control of 24 TTL-compatible output lines and 16 TTL-level input lines. A total of eight boards can be connected to one Atari ST, giving a maximum of 192 outputs and 128 inputs.

The system consists of the 10 board, connected to the ST by a cartridge port adaptor cable. The board is a professionally produced double-sided PTH PCB and the cartridge port adapter connector is gold plated for reliability.

Possible applications include A-to-D and D-to-A converters, mains controllers and relay drivers, security systems, voice recognition, speech synthesis and music, according to Brute Force Microsystems. "The list is only limited by the user's imagination". For more information about STOIC contact Brute Force Microsystems, 13 Murray Avenue, Kilsyth, Glasgow, G65 OLF.

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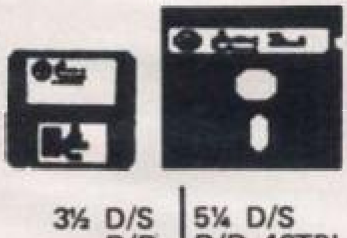
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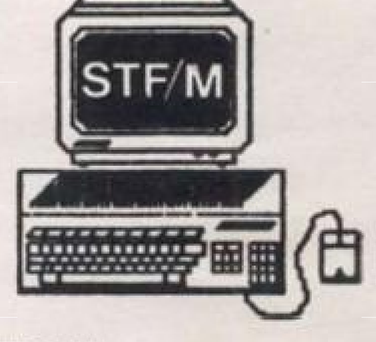
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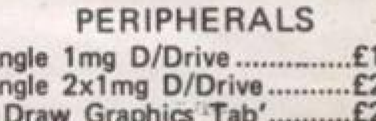
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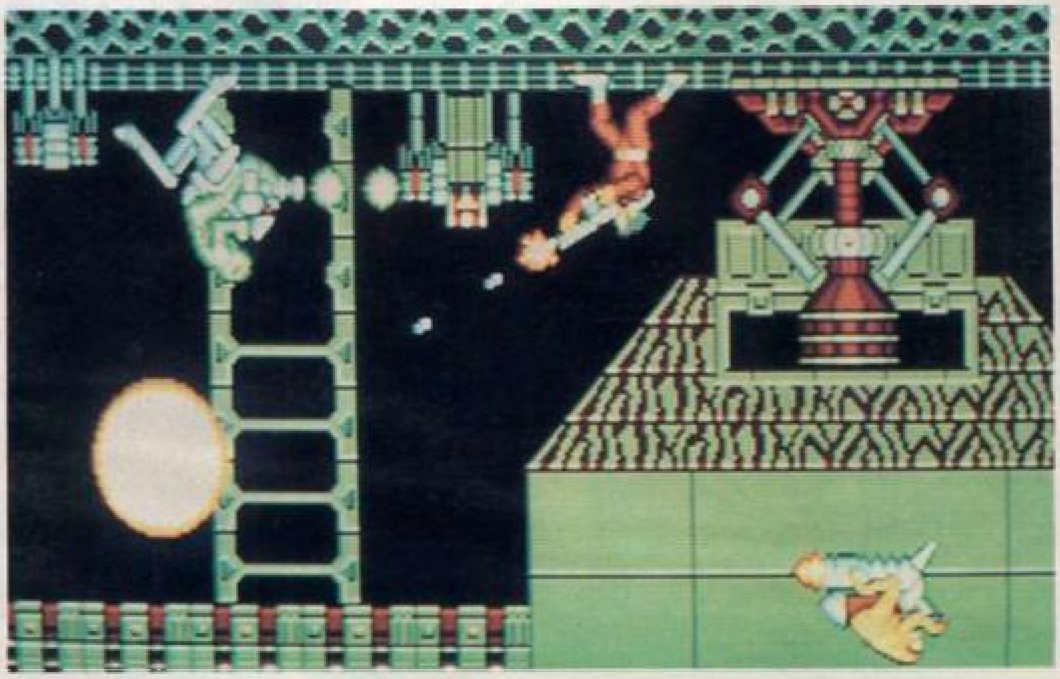
FOR MORE INFO CALL ON THE ABOVE NUMBERS OR SEND SAE AND STATE FULL REQUIREMENTS

Obliterator

Psygnosis, creator of such 16-bit games as *Barbarian* and *Terrorpods*, is about to unveil a new platformish-type explore-and-blast-'em-up game, *Obliterator*. The object is to wander over 100 screens of an alien mothership in search of four thingys which must be sabotaged to disable the mothership and allow Earth's fleet to blow her up.

The opening sequence is what we expect from Psygnosis; an excellent view of the main character looks out of the screen, holding his pistol in salute. Suddenly he lowers the muzzle-simultaneously bringing his left arm across to steady his aim. He fires out of the screen. Thus, the game starts in an unusual way – with the player being killed.

There are many nasties in the game and therein lies its strength. Ones I saw include a trean-dog which climbs through a concealed trapdoor before crawling, Spiderman-like, across the ceiling, a kamikaze-alien which jetpacs along after you and blows itself to kingdom come if it gets close enough and such unlovely items as an alien – green, of course – which floats about, carrying a small capsule.



Shoot this animal and the pod is dropped, shattering on hitting the floor to reveal yet another unsavoury creature. Others resemble the spud-monster from *Ghostbusters* and some even have their own mounts – I saw three types of beasts of burden.

Besides these and the alien featured so prominently on the cover sleeve, there are also creatures which move by turning into another dimension – they keep vanishing. There is even an undulating robot mooted for the final version. The game looks a good blast.

Roy Stead.

Tonic tile

You can accuse the French of being many things but, apparently, original is not one of them. *Tonic tile* was written in the land of corpulent farmers and released by The Edge in the U.K. You have to wonder at the judgement because Tonic tile is just another version of *Arkanoid*.

It is one of two discs, the reason for which soon becomes apparent. Sampled Gallic music bursts forth during loading and it goes on monotonously until all the data is in and it is ready to roll.

Samples crop up all over the place but using them is fairly gratuitous, considering that they are fairly noisy, unimaginative compared to the aural delights offered by the Audiogenic *Impact* and add little to the game except the extra expense incurred for the second disc.

The object naturally is to knock all the bricks out of the multi-shaped walls, hazards being in the form of gyrating tops and amorphous mutations, slinky springs straight from *Marble Madness*, and suggestive red-lipped mouths.

The graphics for the various scenes are well done and undoubtedly the best feature of Tonic tile. Some effort has obviously gone into the design but it is all relative to the other Breakout games and out of that context they will not make anyone gasp.



So what else is there? Extra weapons, as if you could not guess. They look just like those in Arkanoid. The special effect they cause include double shots, extra large bat, multiple balls, slowdown and sticky bat.

One novel feature, probably the only one, is that of a thingy which slides across the screen; hit it with the ball and most of your troubles on that screen are erased.

The big problem with Tonic tile, though, is the animation of the ball, which is dreadful, and the bat, which is disastrous.

At £19.95 and only the graphics to raise it above the competition, it is difficult to see why anyone would want it. Impact has better sonics, Arkanoid has far better gameplay, so if you have either, congratulations.

Mark Ulyatt.

PROGRAM:	**Tonic tile**
PRICE:	**£19.95**
SUPPLIER:	**The Edge**

UPDATE RATING

GRAPHICS	**18**	**55**
SONICS:	**15**	
GAMEPLAY:	**10**	
V.F.M.:	**12**	

Star Wars

With very little pre-release publicity, one of the best 1987 programs emerged from Domark, which for some strange reason put more effort into publicising *Not a Penny More*.

The game is, of course, *Star Wars*, not to be confused with *Star Trek*, now doing the rounds as well. Star Wars was originally an arcade game, circa 1984, which featured fast and smooth vector graphics based on sequences from the 1977 blockbuster film. The good news is that Domark has made an excellent job of converting a game which, it has to be said, is absolutely tailor-made for the ST.

The proceedings start with a choice of three Death Stars to assault. Each represents the game at a different level, the first obviously starting you at level one.

Star Wars is basically a three-part game; the first is shoot the Tie fighters and avoid the returning fire. Your fighter has limited movement but though the enemy weaves to and fro in pseudo 3D you cannot do so, emphasising that this is no Elite-style space war. Initially easy, things hot up considerably when you have three or so Tie fighters lobbing twinkling missiles at you continuously.

Darth Vader also makes a cameo appearance in this section, rather than the final one, which is a little odd. Although you cannot destroy Mr Nasty's ship you receive 2,0 points every time you put a dent in that shiny black armour.

If you survive long enough, and only the clinically incompetent fail here, Luke Skywalker bursts into speech. "Red five I'm going in," and "Look at the size of that thing" are the two choice phrases which I assume are aimed at the rapidly-expanding Death Star rather than Princess Leia.

Part two takes place just above the surface of the Death Star with you belting along blasting the defence emplacements and also the tops from all the yellow towers. Should you manage to hit them all – not at all easy – a handsome bonus of 50,000 points is awarded.

The trouble is that some of the towers are clustered together tightly and when there is defensive fire pouring into the area, losing one or more of your eight shields is almost inevitable. When you are hit, hour ship – and hence the perspective – lurch 45 degrees to one side most alarmingly, precipitating further sustainment of damage.

Then it is on to the very famous trench sequence which has spawned numerous games all by itself. Initially all you have to worry about are the detail-less defence blocks which blast away at you from the sides of the trench. In no time the exhaust





port looms and with one well-aimed shot it is time to go home for the celebrations, the Death Star lighting up space behind you with its death throes.

The next time around it is far more difficult with the catwalks to avoid as well. It becomes really difficult when the catwalks cover two-thirds of the trench and frantic mouse movements are required to perform the maneouvres.

Although there is a choice of mouse or joystick control, the latter is so unresponsive that death by collision can be expected every time. The sound effects accompanying the exploding Death Star are wimpish, to say the least, and that applies to virtually all the sound effects. This criticism does not extend to the use of sampled phrases from the film, though, as they are put to good use.

Although there is nothing technically amazing about Star Wars it has very fast and smooth wireframe graphics and very exciting gameplay. So sit back, turn down the lights, grasp your mouse firmly and roll back the years. Cover me red five, I'm going in.

Mark Ulyatt.

PROGRAM:	**Star Wars**
PRICE:	**£19.95**
SUPPLIER:	**Domark**

UPDATE RATING

GRAPHICS	**18**	**78**
SONICS:	**15**	
GAMEPLAY:	**23**	
V.F.M.:	**22**	

Software Hot Releases

Rainbird has been a firm supporter of 16-bit software since the year dot and has a number of exciting titles which are due imminently or are already out for the ST.

Universal Military Simulator is the answer to every wargamer's dreams with its ST terrain maps, five built-in battles and the facility to design your own conflicts. It is out now at £24.95.

Jinxter, the latest from Anita Sinclair's Magnetic Scrolls, is the next in the award-winning series of *The Pawn* and *Guild of Thieves*. The graphics and gameplay reach the usual high standard and represent the best in pixie guests.

Carrier Command, being programmed by Realtime Software, should be rolling off the Rainbird runway, along with Steve 'Star Trek' Cain and Graham Everett's *Black Lamp*, which features some very pretty graphics. It may nod towards platform and ladders but it looks special.

From the associated label Firebird, *Star Trek* has finally been released. The graphics of the crew and the samples are good for impressing relatives and the next door dog and it is even worth playing now and again.

Novagen had been very quiet since *Mercenary*, but with *Damocles*, the sequel, almost finished, and *Backlash*, the ultimate mindless arcade thrash, the spotlight is once again on that machine code magician, Paul Woakes.

Veteran of the ST market, Microdeal, has a bag of goodies ready for consumption. *Tanglewood, Soccer and Leatherneck* are available, while *Goldrunner II* and *Fright Night* are imminent.

Leatherneck is the interesting one. Not only do you have a superb Rambo style game but you can play it with three friends. A special adaptor which fits in one of the spare ports on the back of the ST provides two extra joysticks.

Ocean was promising *Slap Fight* before the new year, so that should be in the shops by now. *When Time Stood Still* is claimed to be the next release, while ST versions of *Wizball* and *Platoon* are worth checking. Another one to look for is the bizarre *Eco*.

Definitely sitting on a shelf waiting for a new owner department includes the Electronic Arts' brilliant *Bard's Tale*, *Chessmaster 2000*, and *Academy* by CRL. The Hewson *Ranarama* and the graphically wonderful *Defender of the Crown* – Mirrorsoft.

Finally, a quick list of items the software houses were hoping to have in the shops by January – the U.S. Gold driving game licence *Outrun*, which could be amazing, not forgetting *Gauntlet 2*, Mirrorsoft Faery Tale-style *Bermuda Project* and a conversion of motorbiking, *Mean Streak*.

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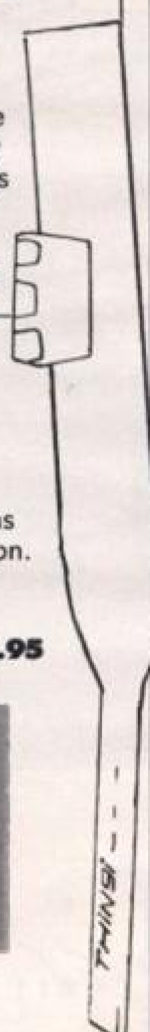
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ALAN TOMPKINS GIVES FEEL TO FORM

With the ST now costing less than £300, many will be moving to 16/32 bits for the first time and will never have used an art package previously. But do not let that deter you from going to your computer shop and buying an art package.

I find that specialist computer shops have the edge over most chain stores, since they can offer more variety in software and accessories. They tend to know what they are talking about and can offer very good back-up. Do not despair if you have no specialist shop near you, as I have bought both a Spectrum and BBC at Smiths in London's Brent Cross and found their service excellent.

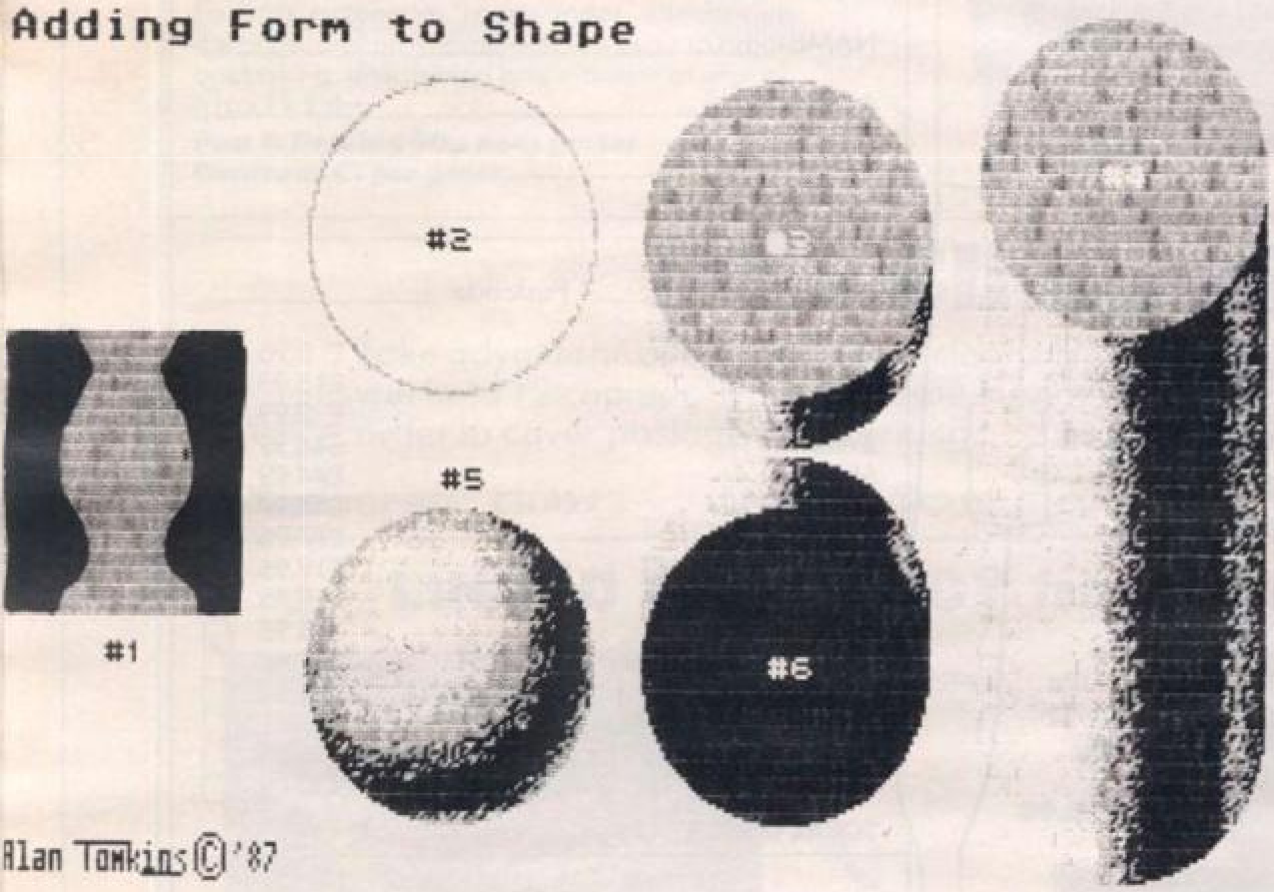
There is also the strange case of the specialist shop in a department store, I buy much of my ST software and accessories at the Silica Shop in Selfridges, because of the knowledge, back-up and friendly service, although how they tolerate all its tourists is beyond me.

Degas is a bit image and not an object-based package. That means the last instruction can be undone but an image cannot be separated from its background.

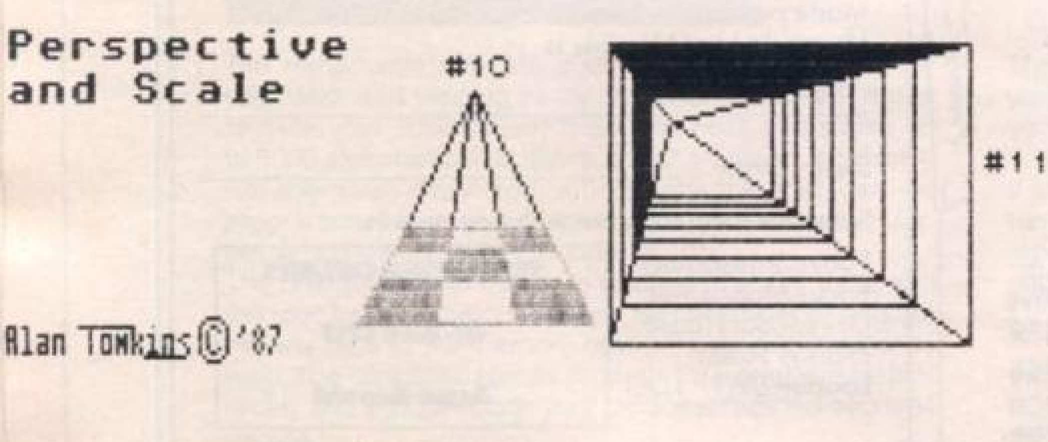
I am still waiting for the first object package on the ST as it will revolutionise computer graphics but the trade-off will be in price. When one appears it will cost more than £200. Take heart, though, for Degas gives you sufficient tools and functions to make very good pictures.

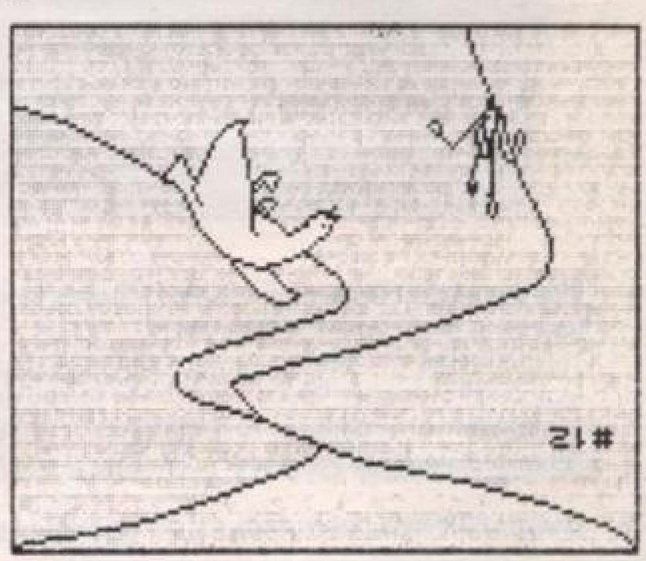
It is also in all three graphic resolutions – low 320 x 200 pixels with 16 colours from 512 palettes: medium, 640 x 200 pixels with four colours; and high, 640 x 400 pixels with only black and white.

To use high-resolution you will need a mono monitor. "Amun-Re" and "Bright Eyes" are both drawn using Degas but









remember that high-res is limited to black and white. To obtain shading you have to space the pixels; an everyday example can be seen in newspaper photographs.

Using Degas you have 38 pre-designed fills and you can create and save to disc your own customised fill patterns. Do not forget to block off the area to be filled first or it will leak into the main picture area. That is where Undo is very useful.

If you fill an area and then decide to change it later, a useful tip is to select the background colour and fill the object lines; that creates a filled area of the background colour only and gives you the base to re-define it. You also have the usual block manipulations to cut and paste between different areas of the picture.

The ray function is a useful aid in creating a focal point for perspective. Also useful for the beginner is the slow draw mode. Unlike Neo, Degas offers a full screen menu which can be toggled to your work screen by right-clicking the mouse. That means you have to mix your colour palette blind, although it gives you a View option.

I find that is not good enough. At the moment art programs are designed by programmers – when will computer companies have an artist to design an art program and then put the artist and programmer together to create a workable tool?

Having said that, there are two functions which make Degas a very usable tool within its constraints, its spray gun and text handling. The spray gun is for me the best in any art package. Not only can you control the speed and size of the spray but the spray is continuous; just hold down the left mouse button to see the pixels spread evenly across the defined area.

The text handling of Degas is superb. When combined with shadow it is second to none. Shadow lets you define one of eight directions. You can also set up to 16 distances of one-pixel multiples, using any of 16 colours.

On the function screen you will find the text window which cycles through six sizes of each text font and you get six text fonts within the program.

After typing your text on-screen, scroll it into position by dragging. In high-res you can create your own text fonts and save them to disc for later use. I create most of my work using *Art Director* but convert to Degas to spray and add text. I then convert to Neo to display in Neo Show, which gives 32 colours on the screen as it scrolls the next picture into position. By swapping between packages you can get the best of all their functions.

The first problem in creating a picture, is how to create a three-dimensional picture on a two-dimensional screen. You cannot do so but there are ways to fool the brain into thinking that what it sees has three dimensions.

If you look at Ancient Eygptian paintings, the first thing you notice is the flatness of their shapes. They are distinctly two-dimensional images on a two-dimensional plane. *Offerings to the shrine of Isis* is an example. Compare those shapes to the work of the Ancient Greco-Romans and you will notice that they had discovered that adding form to shape gives the illusion of depth. Figure one depends on the eye of the viewer to see one of two different shapes, a candlestick or two faces. If you add form to the shapes you can differentiate between the two.

To see this in greater detail, look at figure two. It is a plain circle but when form is added to the shape, as in figure three, it becomes a disc. In figure four it becomes a cylinder, in figure five a sphere, and in figure six a hole.

By the time of the European Renaissance artists were putting form to the shapes between the main objects of a picture; they were also experimenting with perspective and proportion and they added elements of scale to create far more realistic illusions.

In figure seven the cube has only two faces and the receding lines meet at the vanishing point; this is known as one-point perspective. In figure eight an extra vanishing point is added, giving a cube with three faces; this is known as two-point perspective. If the viewer is above or below the horizon, a third vanishing point is added, in which vertical as well as horizontal lines are included – figure none.

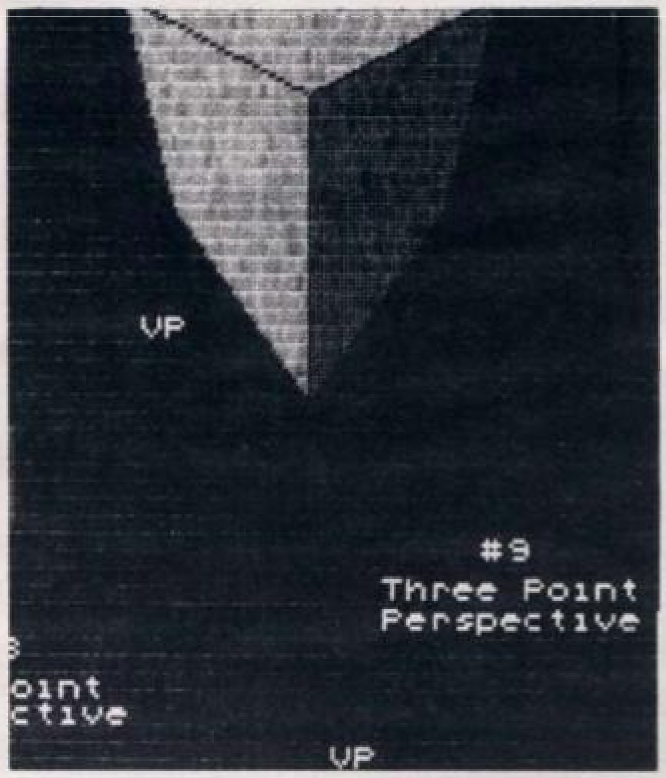
If we draw in perspective, such as the checked board in figure 10, we have a vanishing point to convey to the viewer the illusion of a two-dimensional object receding into the distance, even though it is on two-dimensional plane. The same applies to a three-dimensional object; even though the vanishing point is moved as in figure 11, the illusion is still there.

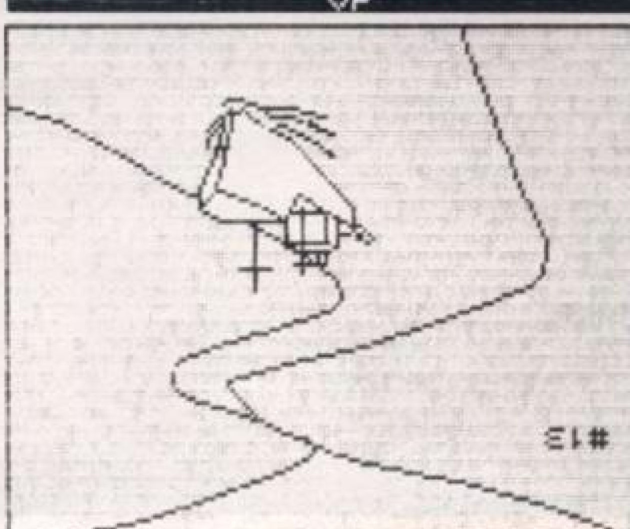
Scale is equally important and can be determined by the viewer when the artist places a familiar object in the foreground; in figure 12 and 13 the backgrounds are the same but different scale is conveyed to the viewer by the bird and the ship. You might visit an art Gallery or museum to look for the use of these principles.

You will soon find from this that you can see art from a new angle and have a new appreciation for the Masters. You can also check at your local book-shop. A good book to start, although it does not cover computer graphics, is *The Artists' Manual* published by MacDonald.

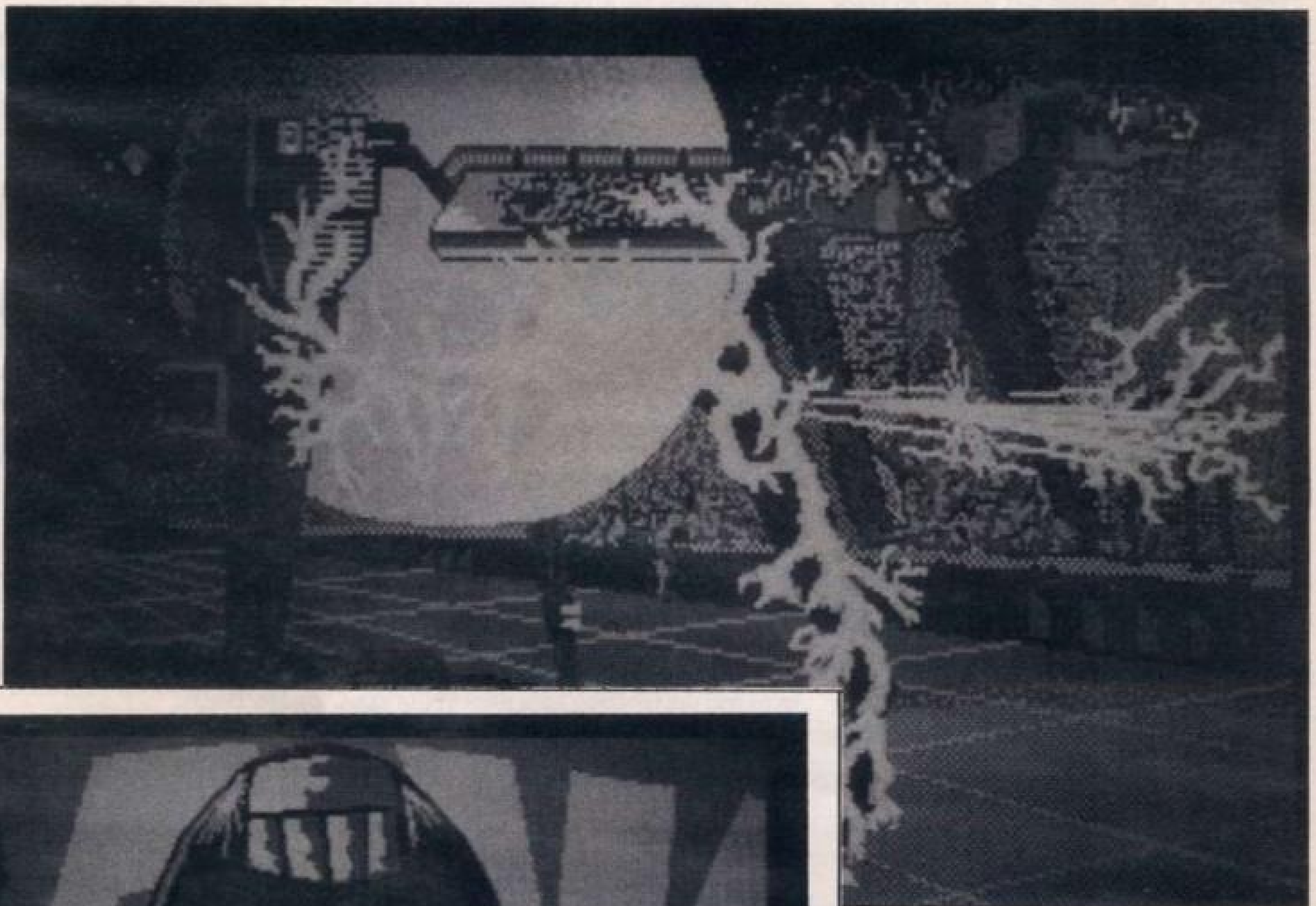
Always look at the work of others, see the way the artist has constructed the picture, then try to copy it on your ST; you will soon find you are developing your own style.

An excellent source of computer graphics is the Magnetic Scrolls adventures released by Rainbird, *The Pawn* and *Guild of Thieves;* they were all drawn using Neochrome.







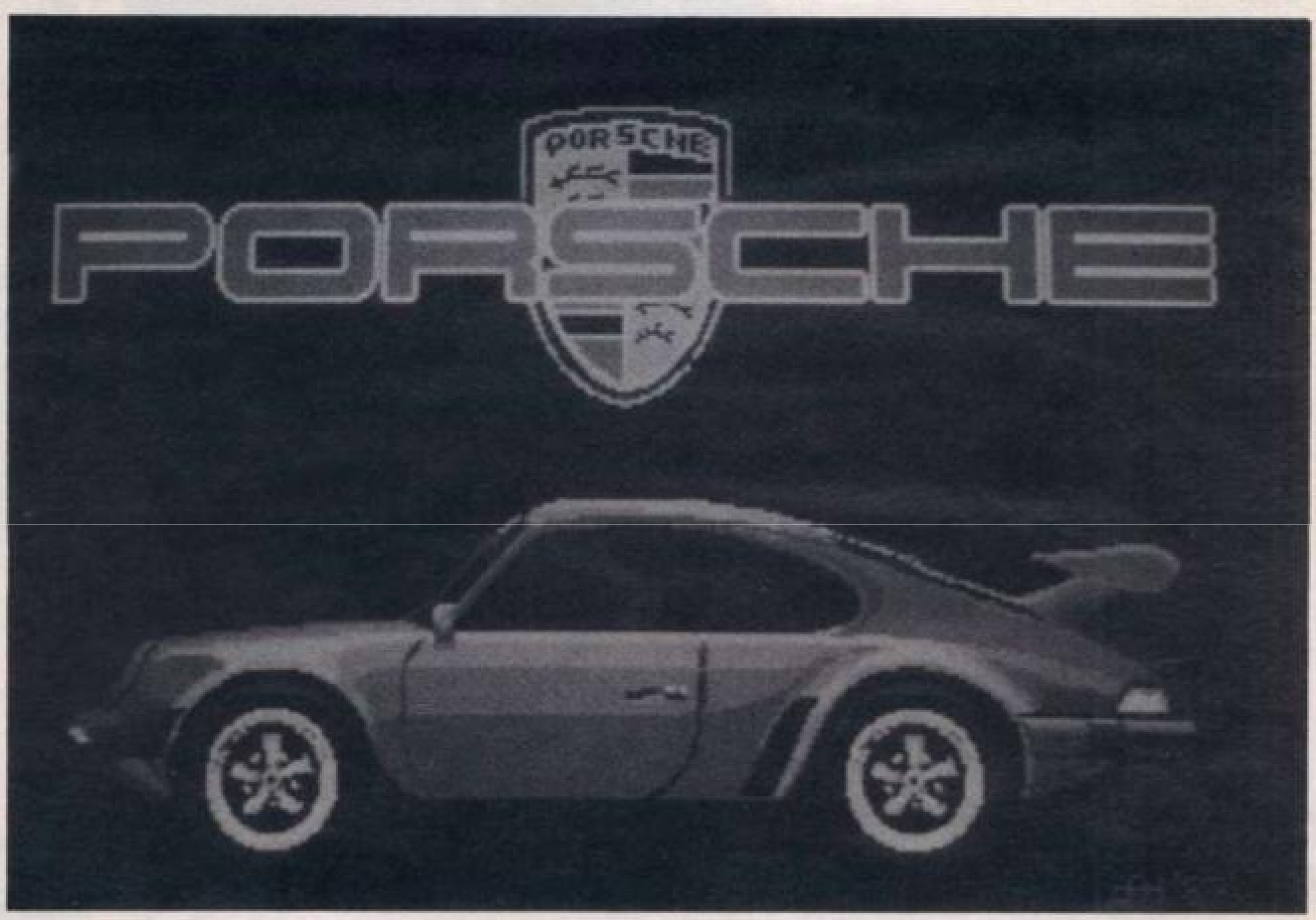


● Right: Grid lines are commonly used to create depth to a picture.



Mr N Colledge

● Left: Marvel characters are a good place to start drawing faces.



● Left: Looking at surfaces in black and white shows where colours begin and end.

● Right: Creative use of black space can be effective.



Mr J Hart

● Left: Some things just need colour to work.



Mr A Blackwell

● Other things just need space.



Mr J Stern

The Travel Game

Price: £24.95
Machine: IBM PC-compatibles
Publisher: Ruleformal Ltd.
0223 341135



● *The Travel Game* – **old-fashioned wit and computer technology combined.**

The Travel Game is a charming combination of PC technology and old-fashioned brain-teaser. The idea is to travel round the world, collecting clues which lead you to the next destination. The ultimate prize is the Endgame, worth £5,000 to the first person who cracks the puzzle the amount increases by one each time another copy of the game is sold.

A clock in the top right of the screen records the passage of time – you play in *The Travel Game* time rather than real-time. Generous help is always available so that you can begin the game immediately; alternatively, you can choose a half-hour demonstration to familiarise yourself with the style of the game. A third option is to print the help text.

Since the object is to complete the game in as short a time as possible, time is one factor with which to contend. The other is money. At the beginning you are given £500 which you use to pay for travel. You also need money to buy souvenirs which provide the hints as to your next destination and might also give clues as to the Endgame.

The problem is that your money disappears quickly as you travel, buy souvenirs and have to book hotels unexpectedly overnight. To economise you have to choose your mode of travel and your route carefully. The Travel Game is a game of cunning, strategy and clear thinking.

When you run out of money you must earn more to continue your journey by answering questions. They are sometimes general knowledge questions but more often in the form of brain-teasers which put your through considerable mental agony. Many of the questions resemble the kind of things which used to occur in those Test Your IQ books and demand mental agility. Hints can be bought if necessary. You can pay from £10 to £100 for questions and the difficulty and value of the questions increase accordingly.

The fascination takes over gradually but after a few sessions I was sufficiently hooked to want to spend part of most evenings continuing my journey. The program is written in C, which means that it is fast and powerful; there are none of the semi-bugs or pieces of sloppy programming which seem to bedevil so many games. The more you play the more you adjust to the style, and plan more effectively.

There are no graphics, to ensure that the game will run on any PC. The screen is functional and looks more like a business application than a conventional game some people will find this boring but others will be glad that the game is not slowed by irrelevant graphics.

A box in the top left reminds you of your current location. Most of the screen is occupied by the box, where information, questions and help-text appear. Your instructions are typed-in at the bottom of the screen.

Ronnie goes to Hollywood

Price: £3.99
Machine: Spectrum
Publisher: Eighth Day Software

Ronnie Goes to Hollywood is one of those games which appear simple at first sight and only later the real complications appear. The objective is to become the President of the United States for a week, during which time you, in the person of Ronald Reagan, are in control of all decisions affecting your country.

Most of us have ideas how to go about such a task but it is not so easy as it looks. The newspapers are always lurking in the hopes of catching Ronnie doing something stupid and woe betide him if they do. His personal popularity is what stands between him and impeachment, so he has to be pleasant to the press at all times. Most important of all, he must keep his wig on.

As if all that is not sufficient, he has to look for those nasty little Communist plotters who are round every corner as Ronnie travels round the globe. He will visit Ireland to find his ancestors and Hollywood to re-live his past triumphs. A trip to Geneva for a chat with Russian leaders may prove useful.

Knowing the aim of the game is one thing, accomplishing it is another. Strange things keep happening to poor unsuspecting Ronnie. Why does Caspar Weinberger want him to sign that note? Why did his car stop at a massage parlour? Where are his trousers?

While all this is happening, Ronnie must keep an eye on the computer screen. That will keep him up-to-date on events at home and overseas and allow him to make decisions. A big no-no and he will be booted out of the White House in no time.

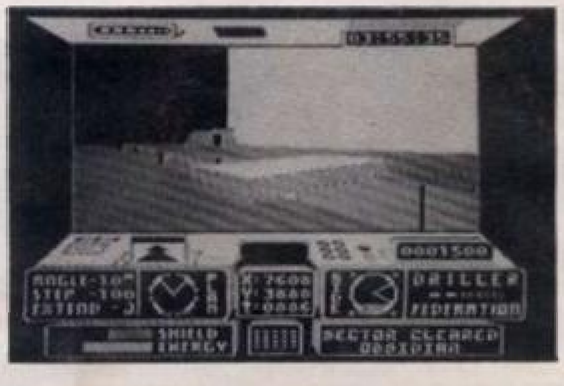
If Ronnie should become bored, why not have him saunter into the War Room and look at the Operations Board? If he feels belligerent, he could always nuke a few of the bad guys although that is scarcely likely to improve his chances of signing a treaty, is it?

Still, with a little manoeuvering and plenty of help from his friends, Ronnie will be able to back all his enemies into a corner. Not only that but he will have the reporters where he wants them, too.

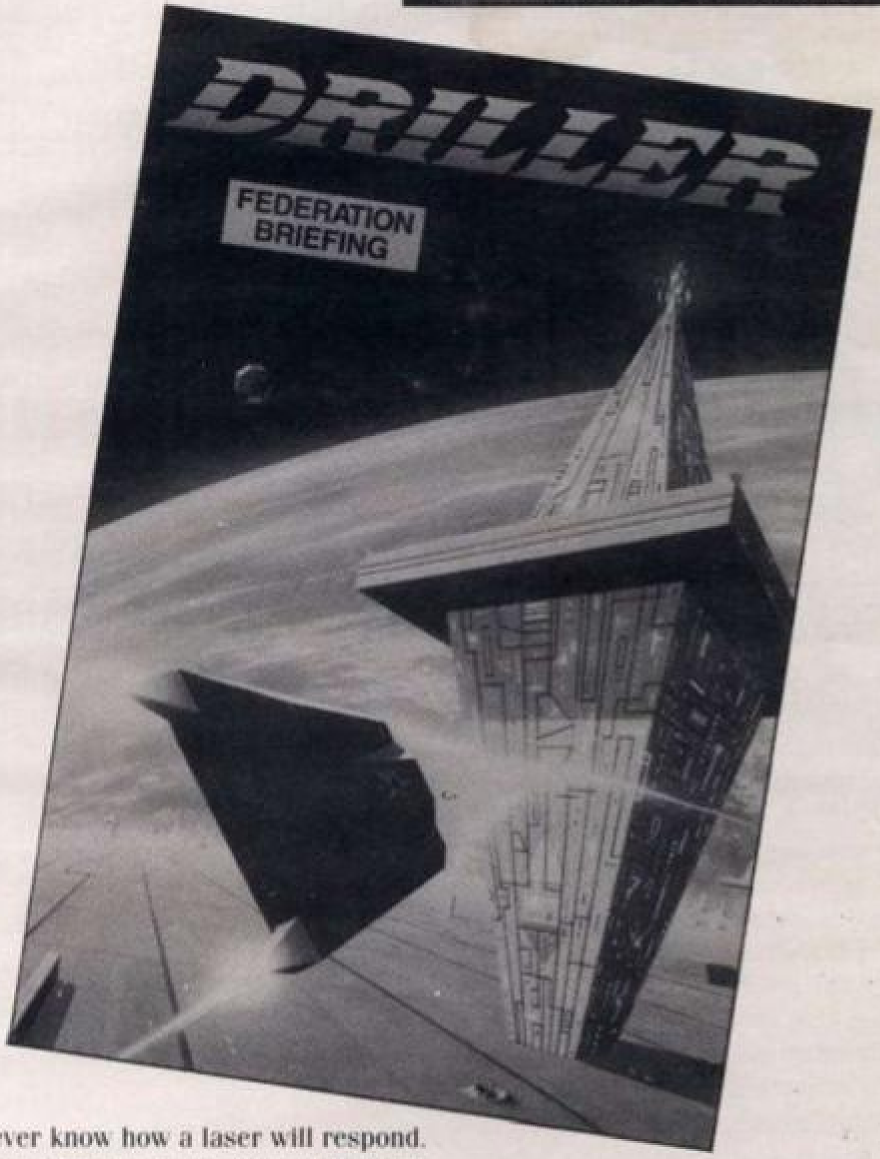
Ronnie Goes To Hollywood is published by one of the smaller software houses but in no way suffers from it. The game is the follow-up to *H.R.H.* and benefits from the same Spitting Image style of humour. The graphic screens complement the text well and for £3.99 the game is good value.

Driller

Price: £14.95 tape, £17.95 disc
Machine: Spectrum, CBM 64 and Amstrad CPC
Publisher: Incentive



● Right: The Freescape graphics are superb in *Driller*.



● Below: The cover of the handbook for *Driller*.

A handsome price but a handsome package, too, for the first Incentive game featuring its new Freescape landscaping technique. The large box contains not only the tape or disc – and a Spectrum Plus-3 disc version is available – but also a glossy 32-page Federation Briefing instruction manual, a reference card of loading instructions and control keys and, finally, a 3D mapping model of the moon Mitral where the game takes place.

I recommend that you construct the model as it helps you navigate round Mitral and, more important, know where you are when you lose your bearings after plunging over the edge of a cliff.

In the world of *Driller*, the earth is a dying planet and a colony has settled in the further reaches of the galaxy on the planet called Earth. Mitral is one of Evath's moons and it is soon to be goodbye Evath, too, as a meteor is heading for the moon, which unfortunately suffers from a build-up of gases beneath the surface of its 18 sectors.

You have been sent to relieve the gas pressure by locating the most suitable drilling places and planting rigs to siphon the gas and reduce the effect of the meteor collision. This is due in four hours' time, and Driller works in real-time, although if you do not have four hours to spare there is a SAVE feature.

What the game is really about, though, is Freescape. It is more than just a filled-in version of the wireframe graphics which have been used in the past to simulate a three-dimensional landscape; it is a way of creating a total and convincing environment. In Freescape you can look left and right, move forward and back, and you can also look up and down so that when you are passing through a tunnel or a door you can tilt back your head and look up to see the roof passing over your head.

You can move behind and even over objects and, as you move, your perspective changes constantly and reasonably quickly, given the amount of data manipulation which must be happening. Walls loom towards you as you approach and there is a 'thunk' if you approach too close and try to walk through them.

There is plenty of humour about Driller. Mitral is defended by various scanners and lasers and you fire at them as you try to find the places to sink your rigs, though you never know how a laser will respond. One just turns its back on you until you look away, when it turns round again and you can hear the lasers smacking into you. Also amusing is the way you plunge off a wall if you are trying to walk along the top and happen to miss your step. It gives a real feeling of falling, making the game and Mitral very real indeed.

Even with a joystick the number of control keys needed is large and it takes a time to get used to them. A keyboard overlay would not have been amiss. Generally the game is well-thought-out, though. You can adjust some of the controls, such as the step-size for when you are moving round. Increase this to help you speed across an empty landscape to the more interesting pieces, then reduce it again as you manoeuvre in the tight corners. You can also alter the angle by which your view changes as you look to left or right.

You can do U-turns, rise or fall vertically to enable you to look over walls and see what is beyond. In short, Freescape is brilliant. The game is not bad, either.

Mike Gerrard

POWER IN PARALLEL

BY USING A NUMBER OF PROCESSING CHIPS IN PARALLEL, THE TRANSPUTER CAN PERFORM POWERFUL OPERATIONS FOR LITTLE EXPENSE. GEOF WHEELWRIGHT REPORTS.

Microprocessor technology is undergoing a wholesale change in the latter half of the 1980s, with 8-bit and 16-bit computer technology giving way to 32-bit systems and radical new designs measured in a very different way.

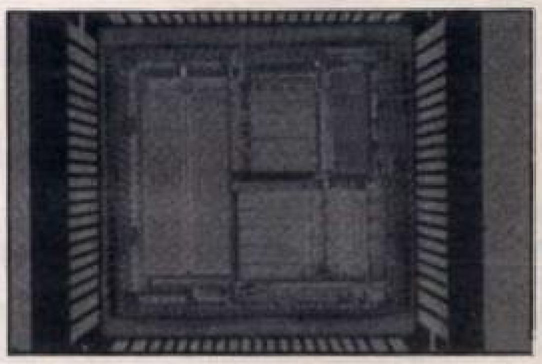
Some of the new microprocessor designs are even finding their way into sub-£5,000 systems for the small business and professional. Large firms such as Acorn and Atari are taking a deep interest in these advances in chip design and manufacture. The Acorn system was announced last year and featured the first major application of the Acorn customised processor to drive the heart of the new Archimedes range.

The Atari machine is called Abaq and uses the U.K.-developed 32-bit transputer as its information processing engine in tandem with the 68000 family computer processors already on offer in the company's line of ST machines. The transputer is part of a new generation of processors using the increasingly-popular Reduced Instruction Set Computer chip technology.

The Abaq will be exceptional in the lower end of the computer market in that computer processors can be added to it – up to a total of four Inmos T-800 transputers. Atari claims this should give the machine, which is not expected to ship until at least mid-way through 1988, power equivalent to that of a minicomputer at high-end microcomputer prices.



● Right: the transputer is capable of generating sophisticated graphics.



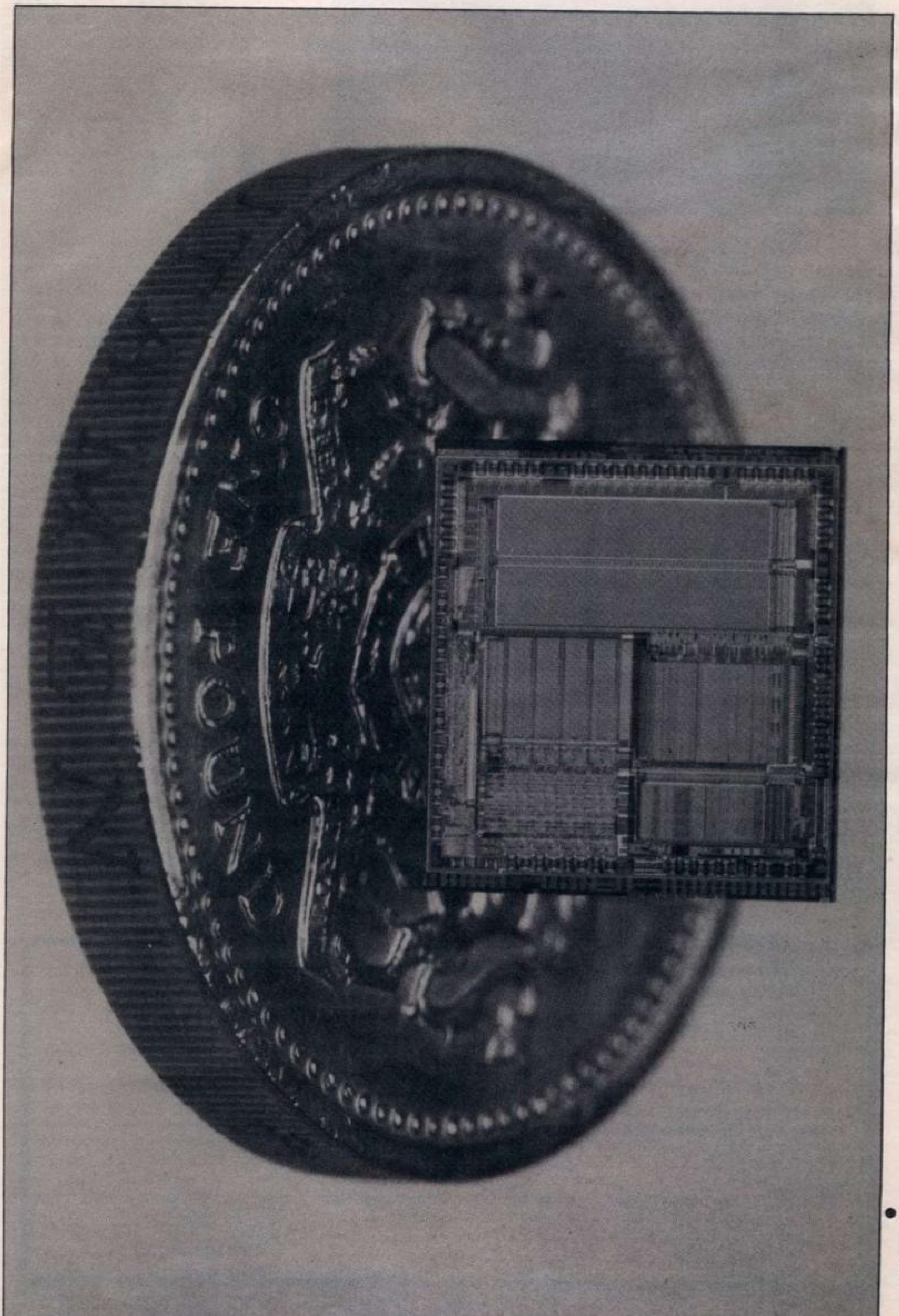
● Right: The Inmos T414 32-bit transputer is a British-made chip.

Yet the key to all this does not really lie with Atari but with the transputer system. It is a specialised form of the aforementioned RISC technology which is making such a splash in the dedicated computer workstation market at present.

RISC

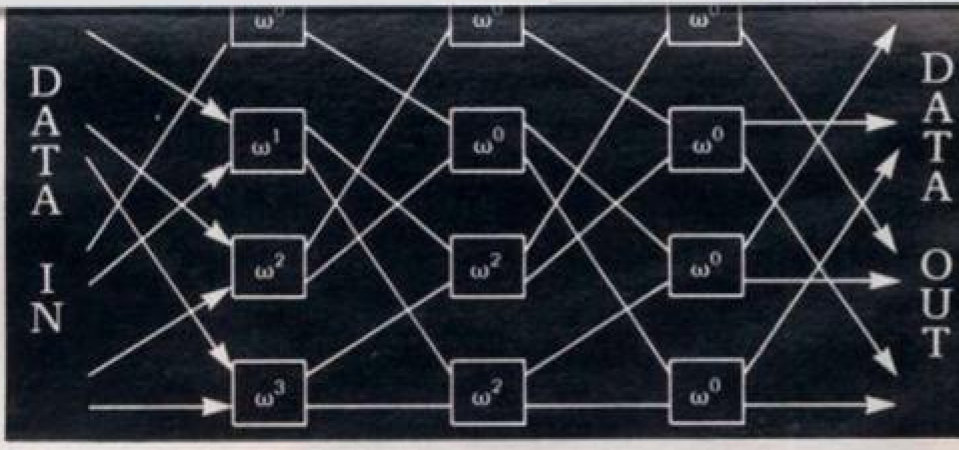
To understand the transputer, you first have to understand RISC. As the name suggests, it is all about using a Reduced Instruction Set. Put simply, this means that instead of building large and complicated computer processors with special commands to perform all kinds of complex operations, RISC-architecture computers use simpler processors with a limited number of instructions. Complex operations are built using combinations of those simple instructions.

Consider, by way of analogy, the contrast between the performance which could be obtained from a E-type Jaguar sports car 20 years ago and the types of speed and acceleration figures from a more modern sports car such as the



● The transputer chip is considerably smaller than a £1 coin.

POWER IN PARALLEL



● By processing in parallel the transputer is capable of communicating sequential processes with a maximum degree of efficiency.

Toyota MR-2. Despite the many technological advances between then and now, a good driver can probably still get better performance from an E-type than the average driver behind the wheel of an MR2. Although there is a more complex central engine in the MR2 which allows the driver to reach high speeds and good rates of acceleration, the skill of a good driver will allow the much simpler engine of the E-type to reach those performance levels by being fast and efficient in the driving of the car.

RISC computers offer better speed and performance figures through a simple processor design with a few instructions which are executed quickly, rather than many complex instructions which may be able to do more but take longer to put into practice.

The only problem with RISC architecture is that it is not compatible with any existing computer processors. The CP/M operating system for the Z-80 chip, the MS-DOS operating system for the Intel 8088 family of processors and the Unix operating system for the Motorola 680000 will not run on it easily.

What is exceptional about the transputer variation on the RISC idea is that the transputer is designed in such a manner that a number of its processor chips can join forces inside a computer to augment the overall processing power.

DEVELOPMENT

Once the idea of multiple linked parallel computer processors becomes popular, there will be a development in operating systems which exploit RISC and the transputer without having to use the half-way house of processor emulation.

There have been computers in this end of the market before which allowed for dual processors – the Apple IIe, the BBC Micro and the Commodore 128 to name three. All of those without exception, however, used the Zilog Z-80 processor as a second processor for the purposes of running the CP/M business computer operating system. So you either used the 6502/6510 processor for your normal operations or the Z-80 for CP/M, but never the processors in parallel.

That, however, is exactly what Atari is proposing to do with the Abaq. Atari claims that will overcome the inherent speed limitations of a microprocessor by using the parallel architecture, allowing it to perform a number of operations simultaneously by spreading tasks among the different processors. While one processor is handling graphics, another could be dealing with sound, another with general input/output and so on.

HARDWARE

Some fantastic claims are being made for the Abaq. 'It would not cost that much to get to 100 millions of instructions per second – the 'horsepower' by which minicomputers re measured,' boasts Atari president Sam Tramiel son of Commodore founder Jack. Tramiel also claims that the Abaq and transputer combination should be taken more seriously in business because they can be linked through a built-in, high-speed port to form a multiprocessor array – essentially a clutch of joined parallel processors – or to form a local area network.

The transputer variant used in the Atari machine is the British Inmos T-800, a 32-bit processor which can run at between 10 and 12 mips. The IBM PC-AT, the more powerful version, runs at around one mip or less.

There is not much point, however, to all this raw processing power without the requisite hardware. For that reason, it is worth looking again at the Atari approach to transputer implementation for an idea of how it works.

MEMORY

Atari has realised that the processing power will not be useful unless there is a large memory for it to address. The Abaq, which is, incidentally, the root word for Abacus therefore has a full 4MB of RAM for the system and another 1MB of RAM for the display.

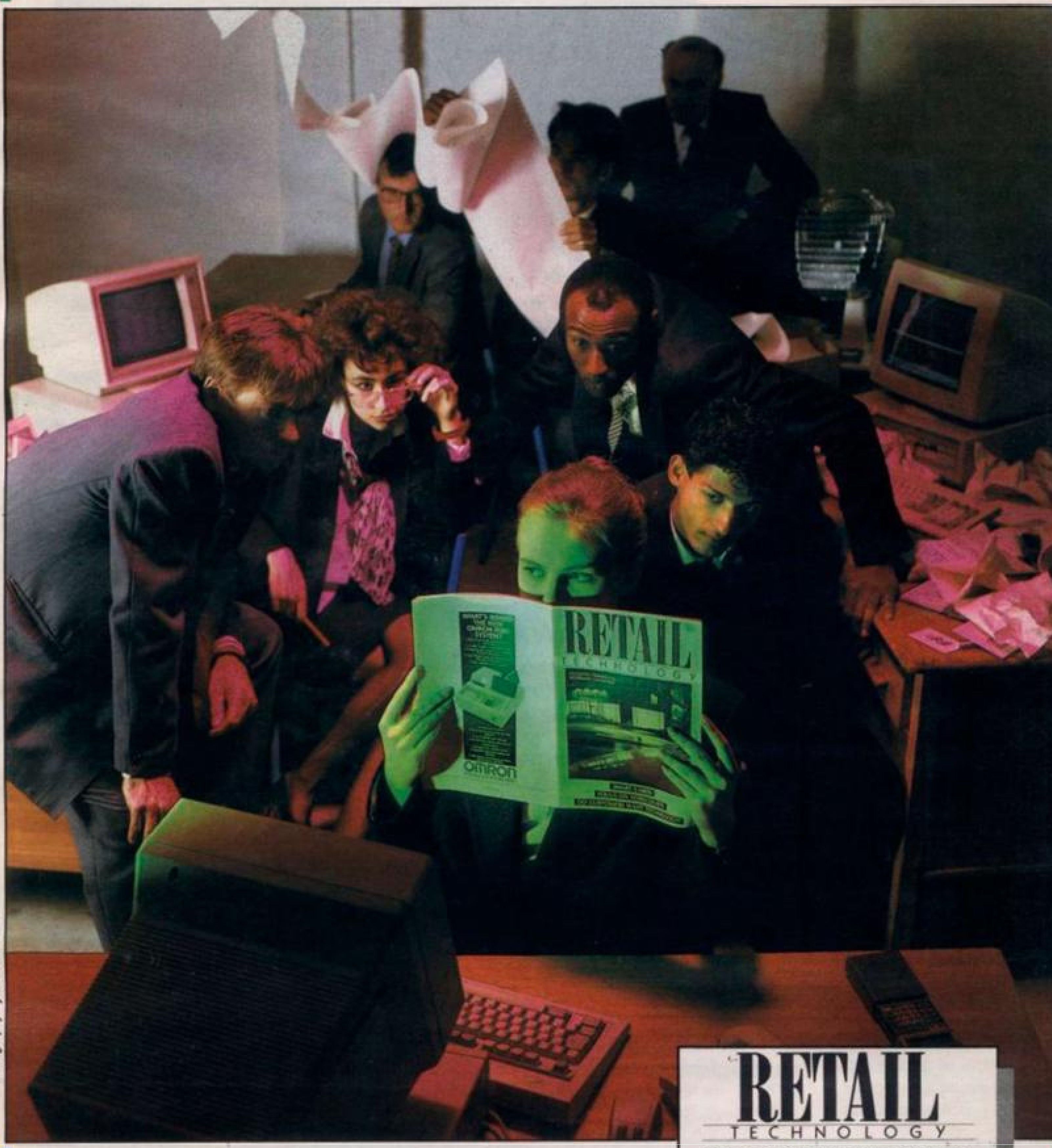
The design has also had to accommodate the fact that transputers work best when hooked together and have access to several input/output devices. Thus the basic Abaq system is expandable via the addition of up to three cards, each of which can hold a total of four T-800 processors. Maximum power can be achieved by chaining together up to 12 of these T-800 processors. As can be seen from the specification, Atari has ambitious plans for graphics functions on the Abaq, to which end it has built-in an impressive graphics facility. It operates in four modes – a super high-resolution 1,280 x 960 in 16 colours suitable for computer-aided design desk-top publishing and photographic-resolution image scanning; 1,024 x 768 in 256 colours, perfect for animated graphics and business presentations as well as most mainstream business applications; 640 x 480 in 256 colours with two screens, excellent for, among other things, emulating IBM PC graphics standards; and 512 x 480 in 16 million colours plus overlays, which should produce about the most stunning games we are likely to see for some time.

SYSTEM

The other crucial issue with the transputer will be the operating system used to address it. Atari has promised a new operating system known as Helios, written by Cambridge-based Perihelion Software. It will provide a Unix-like environment for software developers. Atari claims further that Helios will provide full Atari operating system compatibility with the Abaq.

To some extent, this is missing the point as one of the great joys of the transputer is that it should, in theory at least, free hardware developers from having only certain processors on which they can run given operating systems. That is already happening with the transfer of Unix recently from the Motorola 68000 family of chips to many new RISC chips and the big Intel 80386 processor but the transputer should certainly hasten this.

The transputer, certainly the Abaq implementation of it, should be able to run easily both CP/M and MS-DOS, as well as emulations of home processors at faster speeds than could the real Z-80 or 8088 family of processors. That should make it one of the most flexible processor choices available anywhere. We have probably only just started to see what could become a flood of transputer products released in the next two years or so.



Photography by Andrew Miles

GHOSTS IN THE MACHINE

In the space of eight years or so, around 30-40 makes of computer have bitten the dust, whether dropped by manufacturers to make way for an upgraded model or ditched quietly because of poor sales and lack of software support.

How many, for instance, remember – or even have collecting dust somewhere in the house – the NewBrain, the Aquarius, the Jupiter Ace, the Oric 1 and Oric Atmos? They were all machines developed with specific niches in the market in view; each, the manufacturers believed, represented a way forward yet they are all frankly obsolete compared to the computers which are selling today.

Technological progress and third-party software support are the major factors which determine the success of a computer; distribution channels into stores wields a fair influence, too. The technology which has gone into home micros has been determined largely by price. Take as an arbitrary example, where component costs have fallen dramatically, RAM size. The ZX-81, you will remember, had all of 1K, the Vic-20 3K, and when the Spectrum was launched in 1982, 16K was considered a reasonable amount.

Chip prices then fell at an astonishing rate through 1983-85, to the extent that although Jack Tramiel's Commodore had been able to advertise on the strength of the 64's "massive 64K memory" – points about the amount being left free to the user being put to one side for the moment – by 1985, Tramiel's Atari was able cheerfully to announce an ST machine with 512K for much the same price.

Graphics capabilities – so integral to games playing – sound facilities, processing speed, all progressed at much the same rate and anyone whose machine fell down seriously on any of those points was liable to be left with a dead duck.

The capabilities of machines brings us to software. A notorious chicken-and-egg situation arises whenever a new machine is launched. Without software, a machine does not sell; buyers, once they have tired of 10 PRINT "KEVIN" 20 GOTO 10 will have nothing to do on their new computers. Unfortunately the software houses, wisely from their point of view, are wary of writing for a machine until they can see a growing user base.

Manufacturers are well aware of this pitfall and take various steps to ensure that at least some software is available at or close to launch. In the past, companies tended to release the machine and wait for the software to appear.

Distribution and widespread availability is often overlooked as a reason for success or failure. From 1979-82, computer fanatics were content with mail order. As the high street chain stores jumped on the micro bandwagon it became much easier to visit a local Smiths, Boots or Dixons and walk out with a computer than to wait for weeks for a mail order delivery – or hunt a small specialist shop, even if those who go to computer specialist stores usually swear by them. Manufacturers which persuaded the big chain stores that their computers were what was needed on the shelves did much better than those who did not.

For most of the foregoing reasons, the following micros never really made the grade. If you are still defending your Oric to the death, or would not think of doing your household accounts on anything but your trusty Jupiter Ace, forgive me if I do not sound over-nostalgic. ▶



● "Alas, poor Oric" was the much-favoured lament for the doomed Oric-1 (top). A similar epitaph might equally be applied to many other machines of the early 1980s.

1980 TO 1982

Micros which staked a claim to topple the Sinclair dominance of the U.K. home computer market in the early 1980s and pulled out of, or were pushed out quickly when the going became rough.

JUPITER ACE

Jupiter Cantab was a company set up by Richard Altwasser and Steve Vickers, hardware and software designer respectively, of the Sinclair Spectrum. They intended the Ace to be a Sinclair rival, despite its black-and-white-only capabilities and equally odd keyboard. It was, however, relatively fast but was famous primarily for including Forth as its on-board language in preference to Basic. The machine did not inspire micro users to any great extent and Jupiter Cantab went into receivership in late 1983.

NEWBRAIN

The NewBrain was conceived in 1978 by Sinclair Radionics in the days when Sinclair was being supported by the National Enterprise Board as a revenue-generating project. The revenue was indeed generated – the design for the computer was sold to Newbury Electronics. Although Newbury failed to release the machine, it was, in the meantime, touted as a micro the BBC considered in 1980 for its Micros in Schools project.

Newbury sold the NewBrain project to Grundy Business Systems in 1981; by the time the NewBrain appeared in 1982 it was too late to make any impact. Again, its display was black-and-white only; again it had a non-conventional keyboard; its Basic was deemed unfriendly. The manufacturers went into liquidation in the summer of 1983.

AQUARIUS

The Aquarius micro was the first foray of toy manufacturer Mattel into the computer market proper following its Intellivision games machine – it is now back as importer of the Nintendo games console – in 1983. Intended as a games machine, with some promises of expansion, from 4K to 52K RAM and an optional enhanced Basic, it was not perceived as a strong contender. Mattel sold the rights to the Aquarius to Radofin Electronics soon afterwards. Radofin reduced the price to £50 in August, 1984 but the age never dawned.

NASCOM

The Nascom, produced by Lucas Logic in 1982, with a number of optional enhancement modules added after launch, enjoyed some success in educational sectors before the BBC micro appeared on the scene.

T199/4A

U.S. company Texas Instruments introduced a number of TI machines to the U.K. in the early 1980s, of which the TI99/4A was the best-selling. Continual price reductions placed the machine firmly as a Spectrum competitor but Texas was never very happy in the home computing arena and withdrew from the leisure market in 1984.

SORD M5

The Sord M5 was the first home computer to be imported from Japan, when Sord, then Japan's fastest-growing consumer electronics company, set up in the U.K. in 1982. Something of a halfway house between a console and a computer, the Sord accepted software on cartridge and offered paddle-style game controllers with the machine, as well as a keyboard and programming capabilities.

1983 TO 1984

In 1983-84, the home computer market was booming. Dominated by Sinclair and the Spectrum, with the Commodore 64 for connoisseurs and the BBC B strong in educational fields, leisure micros looked a strong growth area. A number of companies tried to get on the bandwagon; some nearly succeeded.

DRAGON 32

Of all the machines which broke their companies' backs, the Dragon 32 was probably closest to being an outright success, with sales apparently approaching 100,000 and a respectable software catalogue in its heyday. The Dragon still has a band of a few thousand faithful supporters.

The Dragon 32 was launched by Mettoy in July, 1982 and was a sophisticated enough machine at the time. It had double the memory of the 16K Spectrum, supples of which at that time were shaky, a fair Basic implementation and adequate graphics capabilities, even if the most hardened Dragon fan became a little tired of that ubiquitous shade of green.

Towards the end of 1982, Mettoy had to sell the rights to the Dragon as its toy business slid downhill. Dragon Data, established originally as a Mettoy subsidiary, bought the machines and set up in Wales as an independent company. Poor sales in the summer of 1983 led to a rescue package being put together by Prutech and then, in early 1984, GEC took over sales and marketing of the 32.

There was sufficient confidence at the company to announce a new Dragon 64, which appeared briefly, and a MSX specification machine, which did not, but sales appeared to have reached a peak and tailed-off alarmingly.

Dragon Data went into receivership in June, 1984 and its rights were bought a month later by Spanish company Eurohard. GEC continued to toy with the MSX idea for a time but dropped plans by the autumn. Eurohard has since produced a 128K Dragon but little has been heard of it.

LYNX

In the days when 48K RAM was adequate, 64K enormous and 128K incredible, Camputers was producing two Lynx machines, 48K and 96K versions, with a 128K Lynx Laureate and even a 192K machine in the pipeline. The specifications for the series were carefully thought out and the machines certainly were not backward technologically, although the higher memory machines suffered delays in release. While they made it, briefly, into the high street, it was one too many machines for the software companies to cope with and the Lynx range suffered chronically from lack of software.

Camputers went into liquidation in June, 1984. Its chairman, Dick Greenwood, later set up Anston Technology with the intention of saving the Lynx from extinction but was not conspicuously successful.

ORIC

Sometimes one has the impression that the Oric was devised only to provide countless cartoons with the caption "Alas, poor Oric". Certainly the Oric saga is something of a unhappy tale. The Oric 1 was designed by Tangerine Computer Systems, which had financial backing from British Car Auctions, and announced in 1982. It had a "dead flesh" keyboard similar to the first Spectrums, 16K memory, and was an adequate micro for its time, if somewhat dogged by operating system bugs.

By 1984, the Oric 2, better known as the Oric Atmos, was being demonstrated at shows by Oric Products International. With a more conventional keyboard, 48K RAM, the 6502 processor and boasting upwards compatibility from its predecessor, its specification was respectable. There were, however, still reports of bug problems.

The Oric Atmos suffered from poor distribution into bigger stores and the continued overwhelming popularity of the Spectrum with its vast software range. The Oric, like many other micros of the time, was squeezed out both by software companies and consumers.

Despite cashflow problems following a takeover by Edenspring Investments, development went ahead for a new Oric, the Stratos or IQ164 – it was never clear which, Oric management also had plans

for portable and IBM PC clones but it was not to be. The receiver was called in in early 1985, at much the same time as the main Oric distributor, Prism, went into receivership and, four months later, in June, French company Eureka Informatique bought the rights to Oric machines France had always been the strongest Oric market.

MEMOTECH

Launched in May, 1983, Memotech machines were sturdy and well-made, with a good technical specification, carrying the Z-80 processor and making use of CP/M in the larger memory machines in the series. Memotechs had a certain prestige; Memotech owners were perceived to be serious about computing.

Problems with distribution and poor software support never helped Memotech be the success many people felt it deserved to be. Also Memotechs were always costly compared to Spectrums, and even Commodores when Commodore reduced the price of the 64. Perhaps Memotech could have made late headway in the CP/M market had not Amstrad cornered that rather more cheaply in 1985.

Memotech is still around, though in a smaller and different form from the original Memotech Computers Ltd; still based in Oxfordshire and catering for a loyal but dwindling band of supporters.

ENTERPRISE

Enterprise generated a remarkable amount of column inches for a computer company with no computer on the market. The tale of Samurai Computers, which became Elan Computers, which became Flan Computers, which became Enterprise Computers, and all the time tried to release an Enterprise computer was a source of endless fascination.

The Elan Enterprise was announced in August, 1983. It was announced again many times between then and January, 1985, when it finally went on sale. The main problem with the Enterprise was that it had too much technical specification and not enough computer to show for it.

The idea behind the Enterprise was sound. it was to be the computer with no technical equal – large memory, high resolution, good graphics and good sound using custom chips, expandibility – the company slogan was "with obsolescence built out". Unfortunately, problems with the custom chips misbehaving and having to keep the specification up-to-date with relentless technological advances before it had been released led to record-breaking delays.

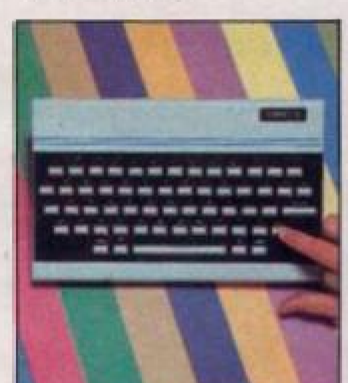
By January, 1985, when it was eventually released, it was too late. A year earlier and it would have had a real impact but in 1985 the U.K. was being over-run with ▶

GHOSTS IN THE MACHINE



- **Above: The Aquarius was a souped-up games machine which never made it.**
- **Right: The Lynx – not enough software.**
- **Below right: The Sord M5 was neither console nor computer.**
- **Below: The Oric 1 featured a "dead flesh" keyboard and was plagued by bugs.**
- **Bottom: The Enterprise was released a year too late for *the market.***









good specification, Z-80-based machines. Besides which Atari had just announced a putative specification for a range of ST machines and people were re-defining their concept of obsolescence in home computers.

The Enterprise machine proved to have been far more interesting in its near-mythical status when it was still on the drawing board than as a micro on the shop shelves and the company went into receivership in mid-1986.

THE UNDEAD

The next two machines do not fit neatly into the category as they are not failures and have contributed to the development of the computer market in the U.K. for a variety of reasons. Yet they certainly cannot be termed successful, since they have fallen short of the manufacturers' or consumers' expectations.

MSX

Nothing infuriates MSX owners more than being told their machine is not a success. They point to billions of sales in Europe, zillions more in Japan and a number of quality arcade titles for the machines.

Even so, MSX has not achieved the overall standardisation, the popularity in the U.K. or its potential as an integral part of the consumer leisure set-up – linked to hi-fis, TV, videos and so on – for which its founders hoped.

The MSX standard was one arrived at by a consortium of mainly Japanese companies, including Sony, Sanyo, Mitsubishi and JVC. Each company in the group would produce a home computer which would have the same basic specification – Z-80 processor, 32K ROM including Microsoft Basic, TI video chip and GI three-channel sound chip. The idea was, in the words of one group representative, "a final solution to the problem of compatibility".

MSX machines arrived in the U.K. in the autumn of 1984 at a standard price, generally agreed to be far too high. By that Christmas, prices were being reduced all over the place.

On the whole, the original MSX sold reasonably well, though we see little sign of a "final solution" scenario arising from its presence. It probably vies with the BBC and Atari XL/XE machines as a fourth choice machine for 8-bit conversions – after Spectrum, Commodore, Amstrad – with some companies favouring it more than others. Most MSX titles are produced with the export market firmly in mind.

The manufacturers certainly were not impressed with the ability of the U.K. public to perceive the importance of MSX. When MSX 2, an upwardly-compatible specification for a range of more sophisticated machines, was introduced, they did not exactly trample over each other in their enthusiasm to sell it in the U.K.

SINCLAIR QL

Opinions vary wildly about the Sinclair QL. Some loved it and still do. Others claim it was simply ahead of its time. Some cruel souls laugh at the mention of its name.

The launch of the QL, in February, 1984, took the home computer world by storm. It was a business machine for less than £400, it had business software packaged with it. It had a 68000 processor – well, a 68000-related processor then – which meant it was a 32-bit system according to Sinclair advertising.

All of that, with the necessary riders, is true but it is also true that the QL used Microdrives. Leaving aside the question of their reliability, it is indisputable that Microdrives are not, were not, and would never become any kind of microcomputing standard. Whatever the users thought of them, Microdrives were perceived to be a problem, a Sinclair quirk.

It is also true that the first QLs were basically unfinished. Their ROMs were on EPROMs and plugged into the cartridge port. The ROMs underwent several changes in the six months after release. Bugs were found in the operating system. Many people disliked the keyboard; Sir Clive Sinclair refused consistently to produce a computer with a conventional keyboard.

Software houses were also at something of a loss as to what to make of the QL. Those companies which specialised in business programs were the ones Sinclair wished to attract; it was keen that the QL should sell as a business machine but the Sinclair market was made up of largely loyal Spectrum owners who wished to upgrade to the new development – and they wanted to play games.

Sinclair Research put a great deal of effort into making the QL more attractive. It held software forums for third-party developers. It even started producing games for the QL; it reduced the price; it eventually badged a 3½in. disk drive. Goodness knows what might have happened to the QL but its life, which in its original form was near its end anyway, was terminated brusquely in 1986 by Amstrad Consumer Electronics.

Having bought the rights to existing Sinclair computers, the Spectrum and QL, Amstrad was interested only in developing the Spectrum. It was left to an independent company, CST, to use the QL specification as a base to produce the Thor.

● **The MSX standard suffered in no small part from being too expensive.**



CONCLUSION

The foregoing is necessarily only a selection. Plenty of other micros almost qualify for inclusion, such as the Tatung Einstein – but the Tatung Einstein is still being produced; the Advance 86, a cheap IBM compatible on which WH Smith was very keen for a time; the Coleco Adam, a video console turned computer – Coleco, sensibly, decided to concentrate on the Cabbage Patch Doll.

What about the Peanut, the Texet, the Binatone, the Laser 2000? The exclusion of micros such as the Acorn Atom, Amstrad CPC664 and all those Atari XLs which are no longer produced is deliberate. The machines were directly superseded by higher-specification models from the same manufacturers and did not bring about the downfall of their developers.

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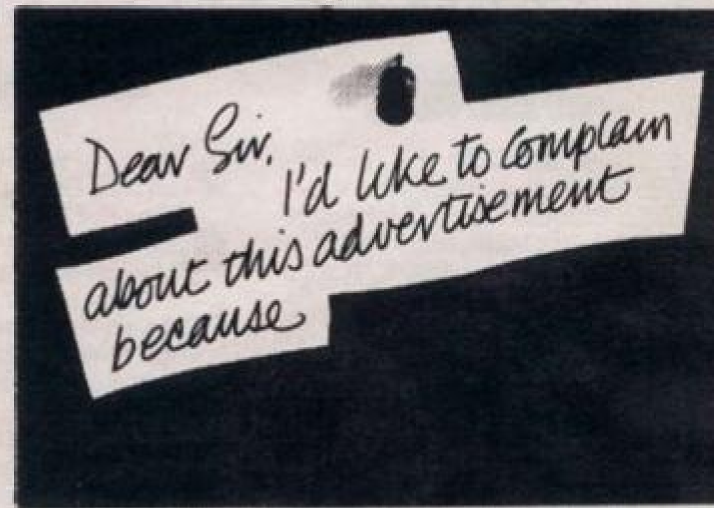
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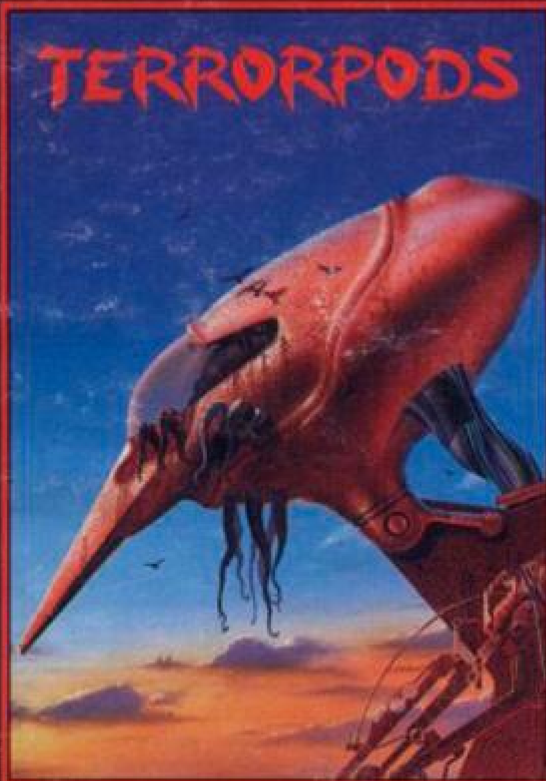
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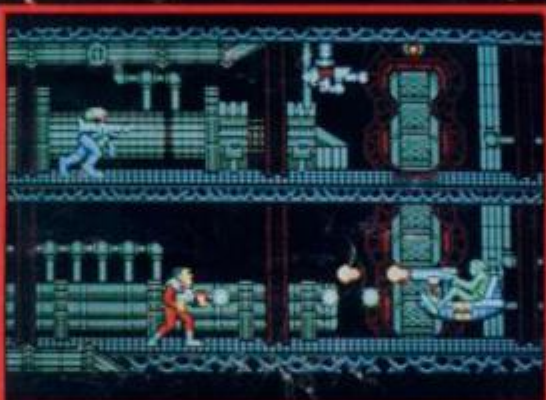
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